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COMPUTERWORLD

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User Defenses Bypassed in Maintenance Fight

By Alan Taylor

Last Dec. 20, IBM set into motion a series of events which vitally affect not only users of IBM's machines but also other equipment manufacturers and even the whole American computer industry.

Dec. 20 was the day IBM mailed letters to two of its customers, informing them that unless they removed the extended core from their 360/30s, IBM would no longer provide maintenance. The same day, IBM sent a letter to Data Recall, the manufacturer of the extended core, informing the company of the letters to the IBM customers.

In the letters, IBM said it was no longer practical for it to maintain the CPUs because of the extensive alterations which had been made to them.

CW Investigative Report

IBM's current row with the independent vendors of extended core has overtones that affect not only users of IBM machines, but also equipment manufacturers and even the whole U.S. computer industry. In this series of *Computerworld* investigative reports, each of these areas will be looked at separately and an attempt made to assess the implications of IBM's actions.

Regardless of what the real motives behind IBM's actions may have been, the effect was to upset the users, damage the credibility of the independent vendors who supplied extended core, and panic some of the financial backers of those vendors into reassessing their involvement.

Of the three parties involved in this squabble – IBM, the users and the vendors – the users are by far in the strongest position of the three. But apparently they don't know it, and have been sitting and fretting on the sidelines.

The users are protected from the arbitrary withdrawal of IBM maintenance services by two things: the 1956 Consent Decree and their contracts with IBM.

Under the consent decree, IBM must provide repair and maintenance service unless "any such machine

(Continued on Page 5)

AMS – IBM Core Hearing Continues

By E. Drake Lundell Jr.
Of the CW Staff

SAN FRANCISCO – The temporary restraining order requiring IBM to continue maintenance for users with extended memory equipment from Itel has been extended until the end of the court proceeding in which Itel is asking for a preliminary injunction barring IBM from withdrawing maintenance services.

The court proceedings to date have largely revolved around procedural questions with major interest sparked last week by the appearance of customer engineers from Comma Corp.

Mike P. Sarno, Comma operations manager here, told the judge that maintenance of computer systems with extended memory from Advanced Memory Systems – which is sold by Itel – was not a large problem for a maintenance man.

Not Big Enough

At the same time, Arthur J. Eickhoff, executive vice-president of the firm, told the court that Comma was simply not big enough to handle maintenance for all of the computer systems presently installed with extended memories.

Meanwhile, Fabritek said that IBM has approved add-on memories in excess of IBM limits for some models of the 360. IBM has agreed to support 360/22 CPUs up to 64K bytes, 360/40 CPUs up to 448K bytes and 360/50 CPUs up to 1 Mbyte, a Fabritek spokesman said, provided the extended core can be made "transparent" to IBM maintenance personnel. As part of the agreement, Fabri-Tek is adapting its interface to meet several IBM recommendations. The 360/30 was not included in the agreement.

Dramatic Plot

A Calcomp 1136 plotter attracts intense interest at the Capital Computer Users' Forum and Exposition. Story and other pictures on Page 4. (CW Photo by E. Bride)

Army-Collected Dossiers, Data Banks Still Around?

WASHINGTON, D.C. – Computerized dossiers on "hundreds of thousands" of Americans compiled by the Army "still exist" despite an Army order to have them destroyed, according to Sen. Sam J. Ervin (D-N.C.).

The files, which were – and possibly still are – poorly managed and administered, included information on congressmen, senators, state and local officials, reporters and even a U.S. Supreme Court justice, Ervin said in a brief filed with the court in the case of *Tatum v. Laird*.

The brief, filed on behalf of the Unitarian Universalist Association, Council for Christian Social Action, American Friends Service Committee and the National Council of Churches, urges the Supreme Court to order a lower court to hear a case challenging the constitutionality of Army surveillance and data bank operations.

Ervin charged that the data banks may still exist in machine-readable form because "information gathered in this program and political analyses produced as part of it were indiscriminately shared and exchanged by the Army."

The Army, Ervin said, distributed data bank data "to other military record systems, and to other federal, state and local agencies maintaining investigative files."

Ervin charged that information on lawful civilian political dissent was merged with files on persons suspected of violations of security and espionage laws.

Property Tax Planned On All L.A. Software

By Marvin Smalheiser
CW Correspondent

LOS ANGELES – Los Angeles County Assessor Philip E. Watson is planning to put software on the tax rolls this year by assessing it as tangible personal property.

But if he goes ahead with his plan he faces a court challenge from IBM, exemption legislation in the California Legislature and protests from users.

A spokesman for the assessor's office said guidelines for assessing software as personal property are being set up and discussions are being held with various industries and businesses. He said action on the plan would be taken very shortly.

While the assessors's office declined to specify what form the assessment would take or how firm the plan is, it was reported that notices have been sent to selected companies asking them to report on their software inventory.

An IBM spokesman in Los Angeles said the corporation is contemplating litigation with Los Angeles County to obtain a court ruling on the personal property tax status of applications programs.

"IBM's attorneys are cooperating with the county assessor's office to determine the best procedure to bring the issue to the courts," he said.

In the California Legislature, assemblyman Joe A. Gonsalves (D-La Marada) has introduced legislation to provide partial exemption for software from the property tax.

A number of users and vendors contacted by *Computerworld* all indicated that the assessor's action could have a serious effect on their operation. They expressed doubt that a practical way of fairly assessing software could be developed.

A spokesman for the assessor also indicated that several other counties in the state were planning similar actions even though the state Board of Equalization recently decided to put off until next year any effort to set up guidelines for making software taxable as property. The board did approve a sales tax on software [CW, March 1].

But the spokesman for the assessor's office said that whether the state acts or not will not change the assessor's obligations to follow the law and assess such property.

Orange County, just south of Los Angeles, has been assessing for three years software inventory of computer companies in the business of developing commercial software packages. And two northern California counties – Santa Clara and Alameda – are also reported to be planning to assess software as personal property.

A spokesman for McDonnell Douglas Automation Co., Long Beach, said the company had received a notice asking it to

(Continued on Page 5)

On the Inside

IBM President Keynotes AMA Conference – *Page 2*

Special Report: Field Open For 3330 Replacements – *Page 8*

'Quik-Scan' Backs Query, Host Languages – *Page 13*

Communications 14
Computer Industry 23
Editorial 10
Education 17
Financial 26
Software/Services 13
Systems/Peripherals ...15

AMA Conference Speaker

IBM's Cary Urges Stronger User, Manufacturer Ties

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – There is a "need for a strengthened partnership between computer manufacturers and users," Frank Cary, IBM president, told the American Management Association's 18th Annual Systems Conference here last week.

Cary told the group the key issue facing the user in the next few years will be one of productivity, both the productivity of the data processing department in a company and the contribution that DP can make to the firm's overall productivity.

To help users increase productivity, Cary said IBM would improve programmer performance by building more programming aids into its operating systems.

Cary also said IBM was trying to upgrade the quality of its own personnel so that they would be better equipped to help the users they deal with.

Cary noted that the business recession made users more cost conscious.

At the same time, however, he said the industry was in no way saturated, and that many users were planning new applications

Frank Cary

that would increase overall computer use.

Technology Labor Costs

There are two forces driving users toward greater use of computer systems: a growing stock of technology and increasing labor costs.

The increasing cost of labor, he said, is the "economic incentive to install or apply technology" that is available.

The two forces are the basis of productivity increases, Cary indicated.

There will be significant increases in the productivity of companies and their computer operations in the years ahead, he predicted, and much of the productivity increases will be due to the use of computers in new applications.

Today, he added, there are many examples of how firms have used computers to increase productivity, but these productivity increases are only starting, he said.

A recent survey of IBM customers, he said, showed there were problems in implementing new applications.

Lack of Money

Although there were plenty of ideas available from users on new applications they would like to see and creative approaches to solving some of these problems, Cary said that a lack of money was slowing implementation of the new ideas.

The typical user allocates around one third of his budget to software, he noted, but only 40% of that is used to develop new applications – or only 12% of the user's overall budget.

Because of this, he said, the survey showed that users were looking to the manufacturers for guidance and help in developing the new application areas.

The survey also showed a great need for better communication between DP management and overall corporate executives, Cary said.

Technology Advances

Cary predicted that there would be "tremendous" advances in computer technology over the next several years, particularly in the area of large-scale integrated circuitry.

These advances will improve computer hardware across the board, he added.

Particularly, he said, large, relatively inexpensive memories would become available to reduce overall hardware costs, increase programmer productivity and help the users implement new applications.

Better Get Smart and Write First Draft Of That Contract, Freed Warns Users

By Edward J. Bride
Of the CW Staff

NEW YORK – Computer users are getting smarter. They are exercising their legal rights earlier in the contract process and are writing preliminary drafts to serve as design "tools" for the final business agreement, according to a contract attorney.

Roy N. Freed said last week that computer contracts should be the "means to an end rather than ends in themselves," and users can apply expertise and strength when they have a first draft of a contract at hand before the start of negotiations.

Addressing computer center and general managers at the American Management Association conference here, Freed noted: "Customers who want to achieve the greatest bargaining effectiveness should recognize that the party who creates the first draft of the agreement gets a real advantage."

It is "much more difficult to tinker with numerous details" in someone else's version, Freed said, and "there is a tendency to skip over items that otherwise would be given careful scrutiny."

Warranties and liability limitations also require "close study," he continued. With the increased number of computer lawsuits, vendors "seem to try to avoid all liability exposures," he observed.

Noting that suppliers are expected to "operate profitably and get fair compensation" for their performance, Freed said "if customers want extensive liability protections, they must be prepared to pay for them.

"In many cases, they will opt to stand the risks and avoid the expense, acting essentially as a self-insurer," he noted.

If a supplier does breach a contract, the user should "identify the types of breaches" and select remedies that will "tend to discourage their occurrence or enable him to escape to an alternative source," he continued.

Freed has long advocated effective contract negotiations as an alternative to litigation. It "generally is a mistake," he stated, to follow the "normal routine of negotiating a price" which is based "implicitly on the suppliers' normal terms," and then consider the terms and conditions to ask for.

To maximize the value of legal techniques, Freed called on users to take the following steps, in order:

- Establish a realistic time schedule.
- Define the objectives in using a computer.
- Draft an agreement reflecting the goals.
- Negotiate with the supplier on those goals.
- Prepare the "formal agreement covering results of negotiations."
- Monitor the success of the procurement.

Quirk 'Would Do Away With DAA'

NEW YORK – AT&T may be moving away from requiring data access arrangements (DAAs) for users of independently produced modems and terminals.

"If I had my way," William Quirk, director of data communications at AT&T, told the American Management Association meeting, "I would do away with the DAA or at least make it free" to users.

However, he said, technical people at Bell have said DAAs are necessary for the protection of the overall network until some other method for protecting the network can be devised.

Certification Program

Most likely, he said, this other form of protection could involve a certification program where the equipment was tested to ensure that it did not damage the phone system.

The current PBX certification program would probably set the pattern for certification of data equipment used with the network, he said.

Quirk said there also was a need to streamline testing procedures for data equipment.

Bell had established one such computer-controlled test center in Texas and was now planning to expand the facilities to 15 other locations around the country, he said.

Quirk also predicted the new specialized carriers for handling data communications would force Bell to give up its national averaging pricing structure.

Bell would have to be competitive in the markets served by the new carriers, he felt, and would probably want to reduce rates in those areas to stay competitive.

At the same time, this would mean higher rates in areas where usage of the phone system was lighter, he said.

Bell would probably move toward a route pricing concept, he noted, so as not to lose the profitable routes that will be served by the new carriers.

Because of pricing changes and general uncertainty in the data communications area, Quirk said, users would have a harder time planning their data communications systems in the future than they do now.

Users will have to take more time in planning and setting up data communications networks, he said, and will have to try to develop and train people skilled in the communications area.

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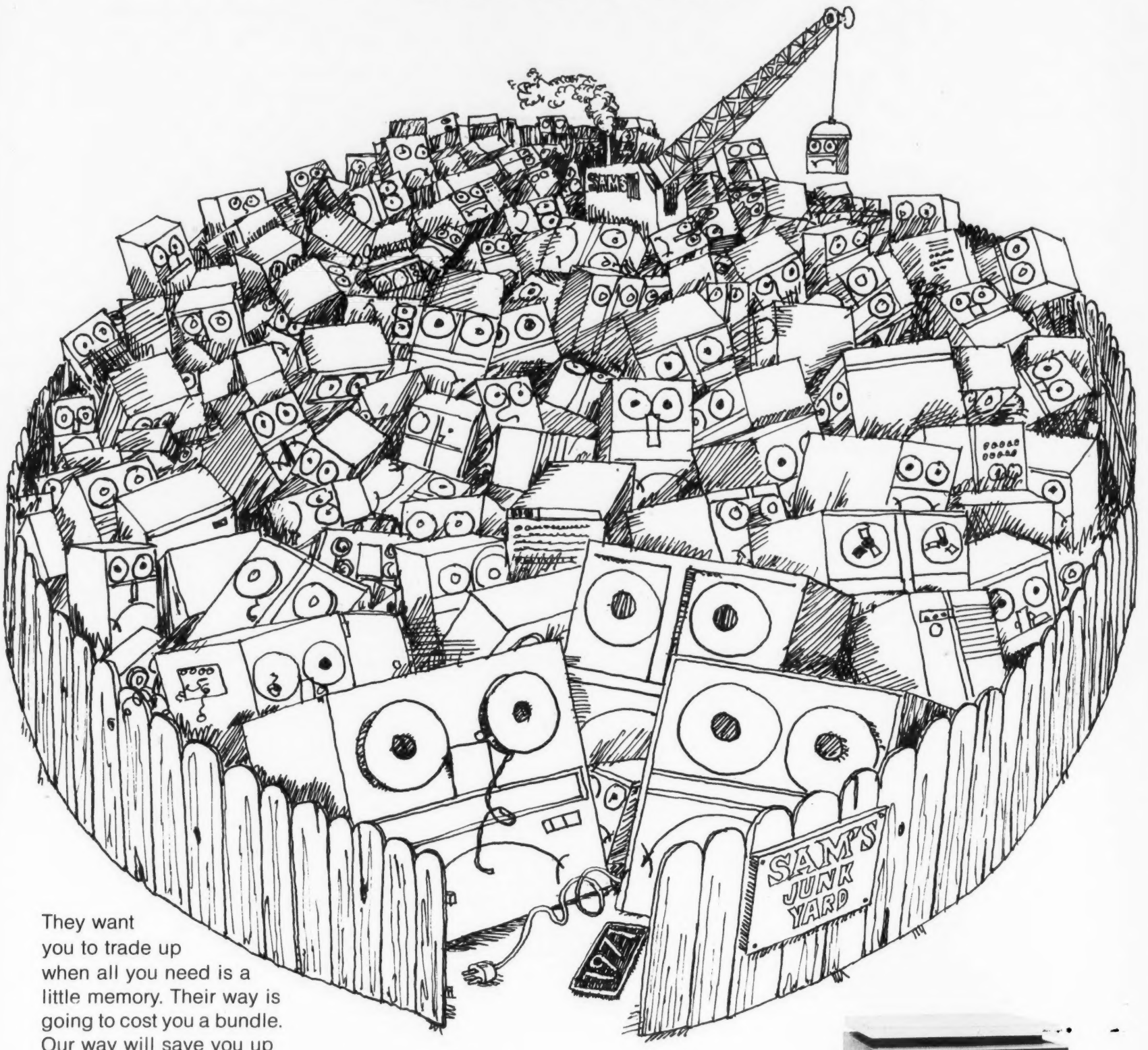

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Communications Users Say

Lack of Trained People Major Problem

WASHINGTON, D.C. – The lack of trained personnel in the area of data communications is the major problem in the field today, most users said last week at a forum on data communications here.

"Getting good people is really hard," according to William Mapp of Martin Marietta Data Systems. "You've either got to grow your own or chase the few that are available."

But while the people can be trained, the user of teleprocessing systems also has to give the data communications specialist the backup he needs to operate effectively after he has been trained.

This means buying line testing equipment and other special equipment needed by the data communications staff to perform fault isolation, and error detection functions.

If the user can call up Bell and point out where the specific problem is, he is much more likely to get quick and effective service, the panelists said.

And maintenance is one of the major headaches the user will have to face if he moves to a multiple supplier system instead of getting all of his equipment from one vendor, according to participants in a workshop led by A.K. Burrough of the U.S. Department of Agriculture.

Maintenance coordination is a hard job for the user and is almost impossible for the user who doesn't have an in-house communications capability, Burrough said.

Burrough told the group – which concerned itself largely with an evaluation of the relative merits of different independents' equipment – that the independents' equipment is generally more cost effective than the equipment from either Bell or the mainframe makers.

But, he warned, the equipment is not always as plug compatible as many users think.

"Most of the equipment works fine if you are using the standard IBM or whatever software.

"But if you have heavily modified the systems or developed your own for your particular requirements, then you may have trouble in getting the equipment up and running."

In addition, Burrough and co-panelist Joseph F. Cain of the U.S. Geological Survey warned users that they would have to consider human factors in buying equipment as well as the technical features.

Cain noted top management often is not willing to move away from the "IBM, AT&T tie" when choosing new equipment.

Despite cost and other advantages of some independent vendors, "we often need testimonials from other users" before buying independently manufactured wares," he noted.

The panelists also urged checking the equipment to make sure it offered features that made it easier to use.

For example, they said modems that alert the user of a degrading line are invaluable to the user not very experienced in data communications.

In the workshop on leased lines, Mapp told the group leased lines between various computer centers would allow a firm to do load balancing between its various computers – i.e. allow an unsaturated computer center to take over the load of a more saturated computer.

He also warned the users that they might encounter problems with data communications systems not covered in the specifications of the Bell System.

The problem of phase jitter, for example, he said, was not considered in Bell specs, but it became very important when data users began using the amplitude modulation technique.

Since it was not considered in the specs, most users did not expect any problems, but they quickly found that phase jitter was present on the network and that it crippled their data communications until it could be corrected.

In the dial-up data communications workshop, John Gluch, of the Bureau of Prisons, told attendees that daytime data transmission is more costly and less dependable on a switched network.

"A leased line may be necessary" if users must transmit data during business hours, particularly in mid-afternoon in many geographic areas. "We don't even try any more," he commented.

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Capital Users' Forum Views 'Total' Data Entry

WASHINGTON, D.C. – Planning, training and education are the key elements in implementing successful data entry systems, according to speakers here at the Capital Computer Users' Forum and Exposition last week.

Keynote speaker for the data entry workshops, George Bernstein, special assistant to the director of research and development in the Naval Supply Systems Command, told users to take a systems approach to data entry and to know their needs before calling in the suppliers.

Too often, he indicated, users have taken an equipment approach in this area without ever taking a look at the total data entry system.

Edward Scott, of the U.S. Department of Justice said he believed direct data entry on-line was the ideal solution to the data entry problem.

He noted, however, direct on-line data entry from widely dispersed locations is extremely expensive and hard to implement with present software and hardware.

The next best thing is the use of intelligent terminals, he said.

"The use of intelligent terminals gives you about 80% of what you would get with direct on-line data entry," he said, but at a greatly reduced price.

"While the intelligent terminal does not allow quite as much editing as one would get with an on-line direct system, it is a good compromise," he said.

To train the clerks he said users should "start with the assumption that the people are stupid."

He warned against assuming that the clerk knows anything about the system since the people training the clerks might then leave out some important, if very basic information.

Most of the audience at the workshop on keypunch replacement (over 90%) were keypunch users looking to change their data entry systems.

The audience questioned panelist Roy R. Lovelace of the National Education Association closely on monitoring operator performance with key-to-disk systems.

One of the greatest advantages of these systems, he answered, is that they allow the DP manager to keep a close watch on all of his operators, since the device keeps accumulated totals of the operator's workload and performance.

Since personnel costs are a large part of any data entry shop, he said, the systems offer a greater possibility for savings – above and beyond the other savings available with key-to-disk equipment.

At the same time, Lovelace told the users they shouldn't completely eliminate their keypunches when they switch over to the new equipment.

The user will probably want to keep some keypunches around for low volume applications and for backup, he said.

Workshop leader Alice Sparrow of Space Age Computer Systems told the attendees that they did not need to have "super systems" in order to implement direct data entry systems.

Too often, she indicated, users are scared away from direct data entry because they feel they need very large CPUs to handle the job.

This is not true, she said, describing her experiences with direct data entry of systems such as an IBM 360/40.

Bernstein, however, seemed to echo many of the attendees' feelings when he noted that direct data entry seems to be further in the future than most of the other data entry methods.

Today there is a real need for education on the uses of OCR, most of the attendees at the workshop on OCR, conducted by Eugene Silverman of the U.S. Geologic Survey, concluded.

Despite early, notable failures, Silverman indicated that OCR has come a long way and that it is now a viable alternative to other data entry systems.

Panelists Cite Greater Use for Cobol

WASHINGTON, D.C. – The panel session on the third day of the *Computerworld* Forum finished with a debate on the merits of Cobol vs. PL/1, with attendees agreeing that PL/1 requires a highly intelligent user. This need cannot be met in many installations so the less efficient Cobol must be used, panelists commented.

Even so, "Cobol is not a substitute for documentation," noted Charles P. Lecht, as the discussion continued.

Edward Utley, of Group Hospitalization Inc., the Blue Cross/Blue Shield organization for metropolitan Washington, said the inability to cost internal jobs is one reason for uncertainty.

Although many DP centers are not run as profit centers, the ability to charge properly for a computer run is essential to proper management, attendees agreed. The small computer shop is better suited and equipped to cost out jobs, while the multiprogramming environment makes this procedure difficult, if not impossible, they said.

In another of the workshops, Dr. Patrick Hagerty observed that some jobs are still best and most efficiently run on such early machines as a 1401 "or even a 407." Clocking hours worked and preparing payrolls in small companies would be specific examples, he noted, adding, "you'd be surprised how many companies are doing that simple job on a 360/195."

Finding qualified people to handle systems modifications is the biggest problem facing users who want to improve their computer efficiency by improving their software, according to Hagerty, chief of systems programming at the University of Maryland's computer science center.

Potential maintenance problems were of greatest concern to users in a workshop on core extensions conducted by Tom Marshall of the Federal Reserve Board.

The problem of preventive maintenance in a multivendor shop was a major worry, with several users reporting that the preventive maintenance periods had to be extended in order to accommodate the different companys' maintenance men.

One way to handle the different vendor maintenance men problem is to schedule all preventive maintenance for one time. Then the maintenance men from the different vendors get used to working together, one user said.

Nick Suszynski, of the Federal Deposit Insurance Corp., conducted the independent peripherals workshop.

There is still a "great deal of life" left for the 360 machines, Suszynski said, especially for users with plug-to-plug compatible devices from independent vendors.

IBM Bypasses User Defenses in Maintenance Fight

(Continued from Page 1)

shall be altered, or connected by mechanical or electrical means to another machine, in such a manner as to render its maintenance and repair impractical for IBM personnel having had the standard training and instruction provided by IBM to such maintenance and repair personnel . . . "

Purchase customers are protected by the "access to machines" section of their contracts. Maintenance may be withdrawn only "if persons other than IBM representatives shall perform maintenance or repair of the machine, and as a result further repair by IBM is required . . . IBM may withdraw the machine from this agreement upon written notice following any repetition of the need for additional repair of such machine caused by non-IBM maintenance activity."

Rental customers are protected by the "alterations and attachments" section of their contracts. However, "if the alteration or attachment interferes with the normal and satisfactory operation or maintenance of any of the machines in such manner as to increase substantially the cost of maintenance thereof, or create a safety hazard, the customer will, upon notice from IBM to that effect, promptly remove the alteration or attachment and restore the machines to their normal condition."

To date, however, no customer has demanded that IBM show actual evidence of a contract violation. Nor has any customer demanded that IBM prove that the altered machines are impractical to maintain.

Because the customers, perhaps unaware of their rights, have failed to act, the independent manufacturers have felt the full effect of IBM's actions.

Data Recall, when the uproar started, was in a peculiar position. After a very successful year, it was looking for money with which to expand. The company had decided to go into registration and IBM's actions or a suit by Data Recall against IBM could well scare off the capital the company was looking for.

Another of the extended core vendors, Advanced Memory Systems, also was in registration at the time IBM moved against AMS installations.

IBM's real objective in rocking the boat may have been revealed in the Dec. 20 letter to Data Recall from John R. MacFarlane, IBM's industrial products marketing manager. MacFarlane noted that IBM had had no problem with installations "where Data Recall has added 32K to IBM CPUs with 32K." In other words, if Data Recall would respect the IBM-imposed 64K limit on Model 30s, Data Recall had IBM's blessing to add memories even to CPUs rented from IBM.

This could be a very lucrative market for Data Recall, and Data Recall may yet settle on these or some other terms.

The implication in MacFarlane's statement is that IBM didn't want Model 30s extended beyond 64K, possibly because it would put IBM in price/performance competition with the 370 CPUs.

Since December, though, IBM's objective seems to have changed. IBM now seems willing to allow extended core to be installed provided it is "transparent" to IBM's maintenance personnel. This can be accomplished by attaching the extended core through a bypass switch. When the switch is thrown to the off position, the CPU is restored to its original condition.

Installation in this manner, however, makes it impossible for the independent vendor to use any of IBM's circuitry. Any circuitry, such as read-only memory, required by the extended core must be duplicated and mounted elsewhere.

There are two possibilities: IBM is trying to make the addition of extended core more expensive and/or it is trying to prevent the users from discovering they have a right to modify the CPU circuits.

But the whole IBM attack may fall apart simply because it was not carried out properly.

In the letters to the users, IBM did not cite the appropriate contract sections, nor did it cite supporting evidence that the agreements had been breached.

Moreover, IBM did not seek court approval for its actions. Although the consent decree did spell out the conditions under which IBM could withdraw maintenance, it did not define how such a situation, if it ever occurred, should be handled.

Since Federal Judge David N. Edelstein retained jurisdiction in the case so that the parties could apply to the court for whatever direction might be appropriate in carrying out the judgment, IBM could have sought a ruling from the court.

It did not.

Meanwhile, the situation stands that IBM has bypassed user defenses, and confronted independent manufacturers directly. A great deal will depend on how strong the independents are, and whether they can protect their positions.

Property Tax Planned On All L.A. Software

(Continued from Page 1)

submit a list of its software within a very short time.

He declined to comment on the assessor's plan other than to say it was under consideration at corporate headquarters in St. Louis.

Martin Pater, assistant vice-president of computer operations of Beneficial Computer Services, Los Angeles, told CW: "On a user basis, I don't see where they can apply it and control it. Every time a program is changed, is it then a new program?"

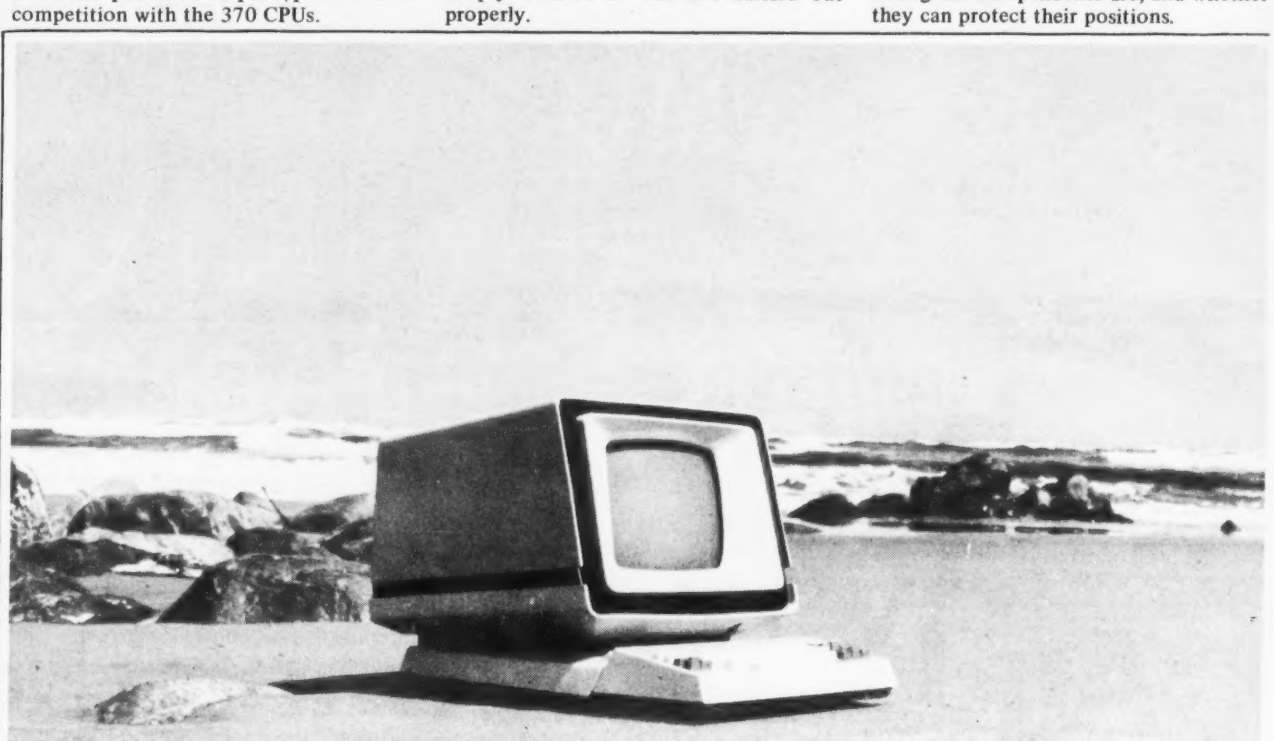
Bryan Wilkinson of J. Tollner & Associates, management consultants, said the tax assessor's plan might result in a capricious approach to taxing.

"There is no way they are going to tell initially what packages people have for sale and what packages they don't have for sale, or what would they do with software not sold in two or three years or never sold or software made for a machine no longer in existence," he said.

Colby Springer, president of Systems Research Inc., an independent software house, said the proposal would hurt quite a few of his clients who have a big investment in software.

He said it might force people to go to some kind of leasing program for software so that the company that produces it has to pick up the tax.

If there is an increased trend to leasing, he said, it could make the small software vendor no longer able to afford the large investment in software development.



As the 'Caravan' Rolls . . .

Incoterm Announces:

Feb. 22 – Add-on memory for its 'intelligent' CRT display terminals

Feb. 29 – Expanded character set and text editing features

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Mar. 21 .....

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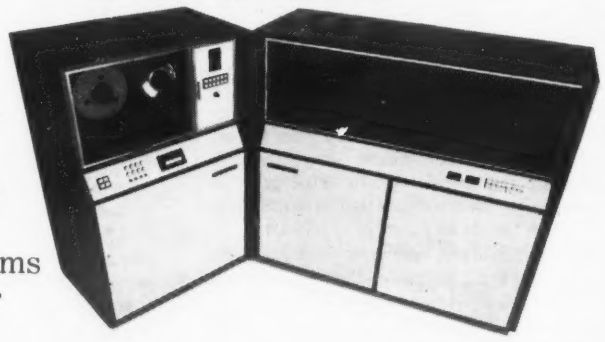

CALCOMP

Report Finds Security Funds Poorly Allocated

NEW YORK – "Despite the high risks, it is clear that investment in computer security is far too small in many corporations, and funds are poorly allocated for maximum effective protection," according to a recent study of the Diebold Research Program.

The study points out that in addition to its vulnerability to criminal acts, DP resources are frequently the victim of accidents and natural events that would not generally be considered "lapses of security" although the consequences are just as devastating; they should be the proper concern of the security staff.

Among the common weaknesses in computer security programs the study mentions:

- Inexpensive, yet highly effective, precautions are frequently overlooked.
- Many existing security measures are not nearly as effective as is commonly believed.
- Many important facets of the DP resource do not receive even minimal attention from a security viewpoint.

The study recommends that corporations recognize that the most effective DP security program requires "total information flow management," a program that concentrates on all the elements of the data flow cycle, not merely those that begin and end in the computer room.

The most cost effective security programs are those that have calculated the exposure to any given threat or combination of threats, the study says. The bulk of the security budget should be expended where the exposure is greatest, not where the probability or the vulnerability is greatest, it continues.

Regardless of its exposure, each corporation should implement a minimal security program to include physical and environmental precautions, employee selection and training, morale and development, tape control and backup.

To supplement the minimum precautions, the study suggests that other measures can be taken to maximize security, but the corporation should recognize that total security is beyond reach.

JAs Leave Calendars For DP Contracts

PROVIDENCE, R.I. – Although it has had success with the sale of computer-prepared calendars, a local Junior Achievement firm has more serious business in mind.

The group, Computec, comprised of high school students, has contracts for the production of labels and another for data input, setting up files and printing reports. Computec also evaluates data on the progress of each JA firm in the state and prints out JA "company of the month" reports.

The firm is the first JA company in the state to offer computer services, according to the group. Under the Junior Achievement program, a company is formed and administered by the student members.

Computec is sponsored by Johnson and Wales College here, and has access to the college's IBM 1130, noted adviser S. Richard Graser, chairman of the college's DP department.

The calendars include pictures of "The Body," a *Playboy*-type nude, the "Peanuts" series of characters and a head of John F. Kennedy. The students seem to have acquired the programs for the calendar printouts, but do all their other work on their own.

One Guard Watches 50 Sites

TORRANCE, Calif. – A closed circuit television system can utilize up to 50 cameras and yet requires the person monitoring it to view only one screen.

Western Bureau of Investigation's (WBI) Total Surveillance System has a built-in minicomputer and memory disk that does all the routine surveillance and alerts the guard only when there's something to see.

The system, which from a single control center can handle up to 50 TV cameras, checks each area under surveillance. As it scans at the rate of 30 sequence/sec, it compares what the camera sees with an image stored in the memory circuit of the area as it appeared when the surveillance began. If there is no change, the system moves on to the next sequence.

The system detects intrusion, movement, fire, small changes in light level and smoke. In addition to audibly sounding an alarm to alert the guard, the minicomputer brings the before, during and after pictures of the scene onto the TV screen. The pictures flash quickly and are rapidly repeated, thereby visually pinpointing any change as movement on the screen.

The company is at 3812 Sepulveda Blvd., 90503.

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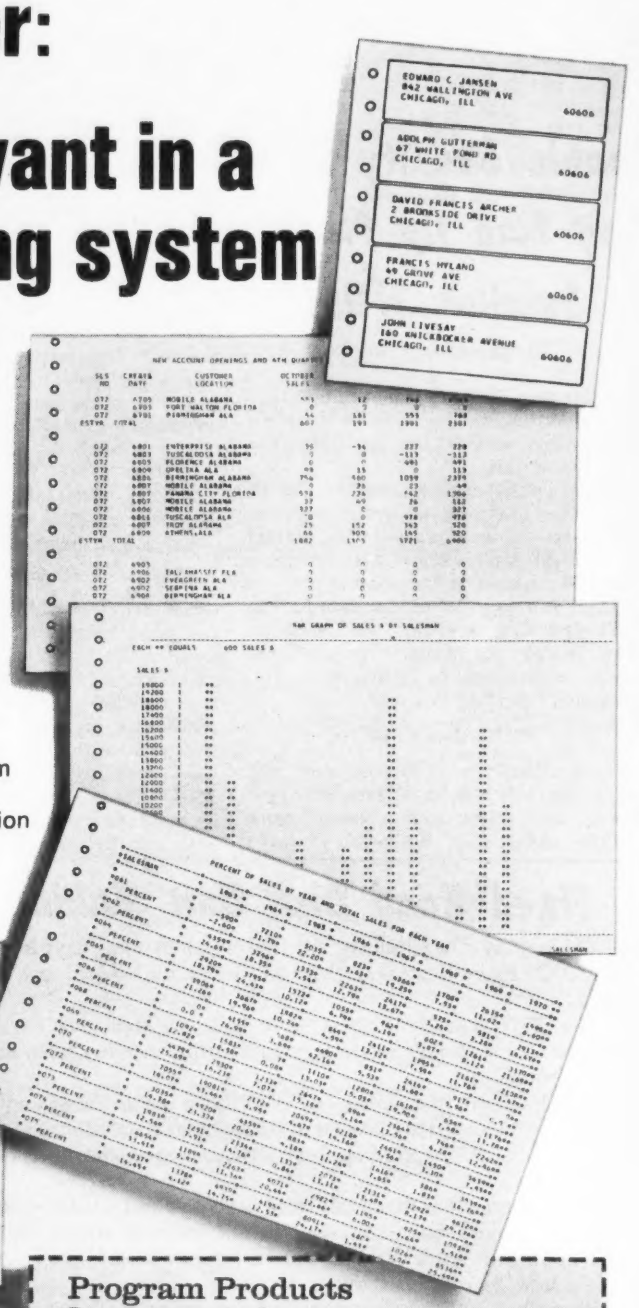

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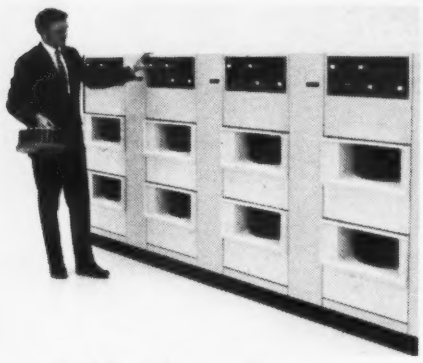
Special Report

Part II

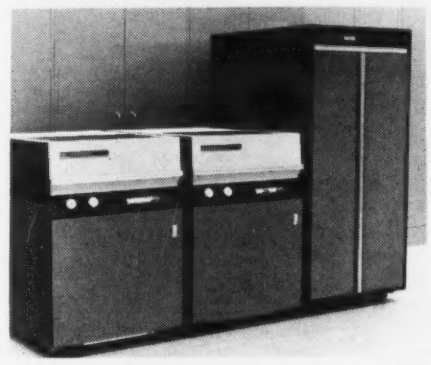
Storage and Internal Processing



The 3330 Sweepstakes:

Independents Gear Up Replacements

"There is no longer any credibility gap for the independent peripheral makers and this should be helpful when the 3330-type systems are introduced."



All the Fuss About This

The 3330 disk storage contains from one to four dual disk modules, each with a capacity of 200-million characters.

Double Density 2314 May Find Its Place On Smaller 370s

By Ronald A. Frank
Of the CW Staff

As 370 users increase, independent suppliers are taking a close look at the main peripheral in most of the new CPUs, the 3330 disk system.

IBM is rapidly approaching the end of its one-year lead time advantage with the 3330, and the independents are gearing up to offer replacements that in many cases will improve on the original.

"There is a very definite market for the 3330-type disk system," according to Mike Murphy of Telex, "and we are totally committed to delivering a [replacement] product this year."

No 'Carbon Copy'

To be called the 6330 subsystem, the Telex disk will not be a "carbon copy," Murphy says. "Our diagnostics will work a little differently. While they use a "floppy disk," we will use a cassette and put the diagnostics right in the controller," he adds. Telex will improve on the 3330 price by "about 10 to 15%," Murphy predicts.

Among the more ambitious 3330 plans are those of Ampex. "We plan to replace IBM 3330s with a little plus in there," Jim Casey says. And that plus looks like it will filter down to 360 users as well.

"We will put our 3330 unit on the 360/50, 65 and up," Casey states. "There will have to be software packages with these units. But there seems to be a requirement among 360 users for a 3330 capability."

Some see the Ampex goal of fitting a 3330 onto the Model 50 as quite ambitious. "Our estimates indicate that it will take about 50 programming changes to OS to adapt the 3330 to a Model 65," one source feels. Such a modification on

"We plan to replace IBM 3330s with a little plus in there . . . and there seems to be a requirement among 360 users for a 3330 capability."

the Model 50 would be more difficult. "If you move below the Model 65, you get a transfer rate probelm," one observer says.

But Ampex sees a good opportunity to help the 360 user who would like additional disk capacity. "I don't think IBM will transfer its 3330 to the 360s. They want to push the 370s and retire the 360s," Casey says. Even if IBM changes its mind, Casey feels his firm can give the 360 user better performance and more capacity at a lower price.

'Wide Variety'

"The 3330 replacement product from the independents will be acceptable to a wide variety of users," according to Ted Withington, a senior staff member at Arthur D. Little. "There is no longer any credibility gap for the independent peripheral makers and this should be helpful when the 3330-type systems are introduced."

There is not much incentive for IBM to adapt the 3330 to the Model 50 and 65 in the 360 family since a large percentage of these systems was purchased. IBM would not want to support 360s that are owned by users and leasing companies, Withington believes.

Another member of the 3330 sweepstakes is Memorex. "If you look at the functional areas of the 3330, there are two areas that can be improved. The first is access time and the second is the packaging of the units themselves," according to Fred Dominick, disk product manager. Memorex will be able to improve on the 3330 access time from 10% to 30%, he predicts.

The Memorex replacement disk will operate on the 65 for 360 users, and Dominick sees recent IBM software moves as a possible advantage. "When OS is frozen on the 360s in favor of the new Advanced Operating System (AOS) or its equivalent, the independent will find a much more stable environment into which he can add his 3330 software," he says. When the user's fear with respect to software changes vanishes, it will make him more receptive to add independent 3330 software, Dominick believes.

Some think the 3330 is too large for many 370 users. "The way you use the 3330 has to be different from the way you use traditional disks," Withington cautions. He sees the 3330 packs as too large and expensive to change frequently. And this makes it impractical to assign packs to individual programs and programmers. In addition, the 3330 user can run into a bottleneck because the one available arm can only be in one place at a time. "So the user has to get in line for that one arm, there are fewer seeks per second and access time can mount," Withington says. With these problems some 370 users will not consider the 3330.

Many independents agree. And surprisingly they feel they have the solution already perfected and ready to roll. "The double density 2314 may well have a place on the smaller 370 systems," one independent maintains.

"The average 360 user today with disk has the equivalent of a controller and six spindles of the 2314 type," according to Jim Pyle of Calcomp. This user has something less than a full maximum 2314 system, he says.

An Alternative?

Double density 2314-type disk systems, such as this one from CDC, are helping 360 users increase their storage These systems may also have a place on smaller 370 CPUs.

"These users don't have two controllers each with eight spindles," Pyle feels. "And they didn't just quadruple their needs to match the 3330's equivalent of 16, 2314 spindles."

And users of 370/135 and 145 systems who don't need the large-scale storage of the 3330 from IBM are already consider-

And users . . . who don't need the large-scale storage of a 3330 from IBM are already considering attaching the double density 2314 to their CPUs.

ing attaching the double density 2314 to their CPUs. "This makes a good deal of sense to attach directly to the CPU, thereby saving the cost of the Integrated File Adapter (IFA), according to one independent marketing source.

The IFA on the 135 and 145 is relatively slow. One user recently ran a series of benchmarks on a 370/145 with standard density IBM 2314s. With the IFA, the benchmark programs were run in 32 minutes. Without the IFA the same programs were run in 28 minutes. "This illustrates the type of degrading associated with the IFA," one source says.

Another Benefit

And 370 users who consider double density 2314s can get another benefit by eliminating the IFA. On the 135 the adapter is priced at about $500. "And that is a good portion of the monthly cost on a double density system, that the user has already saved," according to

(Continued on Page 9)

One of the first independent replacement systems for the 3330 will be delivered in the fall by Itel. Users will be able to select any configuration from one to eight spindles while savings could be more than 10% over a comparable IBM system.

Fixed Head Disk Unit Making Waves

The hottest 370 peripheral for IBM watchers these days is not the 3330, but the 2305 Fixed Head Storage Module which can operate with all 370s above the 145.

The 2305 is really a fixed head disk subsystem that could take on added importance with IBM set to announce virtual memory software for the 370 line [CW, March 8].

The 2305 was first announced in 1970 for use on the 85 and 195. As the 370s were introduced, the fixed head disk system was included. The first 2305 was installed in 1971, according to an IBM spokesman, but users of the disk are still limited.

There is no doubt that a fast fixed head disk unit would be very important to a virtual memory user, according to one industry source. But others disagree. "With fixed head devices you need a separate head for each track location. And right now the way technology is moving, that is the most expensive part of a disk system. And it will become more expensive in the future," says Dr. Andrew Gabor, vice-president of Diablo Systems Inc. If access times of movable head disks continue to improve, they will become useful with virtual memory systems, according to Gabor.

The 2305 can store up to 5.4 Mbyte/in 384 addressable tracks. And each track has a maximum data capacity of 14,136 bytes. The system costs $4,900/mo plus $495/mo maintenance. And these figures cover only the Model 1 which is the "smaller" of the two available 2305 configurations.

"The 2305 is the fastest, most expensive disk in the industry with a 2.5 msec access time," one observer says. If IBM is contemplating the addition of virtual memory software for the 370s, the 2305 will play a vital role, he adds.

Pushing Disk Storage

"Users with faster CPUs such as the 370s should seriously consider drum storage systems if speed is important to their application."

Independents Out to Replace Fastrand System

While most independents have one-for-one replacement systems – i.e. offering their disk for an IBM disk system – some independents urge users to switch their storage method.

Ampex is offering a replacement system for the Univac Fastrand drum, which it says gives the user important advantages.

For the large-scale system, the Fastrand drum has a number of limitations, according to Bruce Stewart, product manager at Ampex.

The Fastrand system has an average access time of 92 msec while the disk replacement system has an average access time of 30 msec.

The Ampex Fastrand replacement system runs in two modes. One is Fastrand replacement mode which allows the Univac user to keep his Fastrand software in his CPU. The user simply replaces his Fastrand controller, plugs in the Ampex controller and is ready to roll.

Another advantage of disk over drum storage concerns data security, Stewart says. Many 1108 and other users have to dump their drums each night to be sure their data is secure. With a disk system, they can simply remove a critical disk pack and store it in a secure place, he believes.

Another independent going after the Fastrand Drum is Calcomp. Using 2314 double density disks, the Calcomp Model 1144 disk storage system can save a Univac user "about 20% on cost while increasing his throughput more than 50%," says Jim Pyle of Calcomp.

But a Univac spokesman sees an advantage of a drum over a disk system because the drum is word-addressable. "This means that the user doesn't lose any effective capacity during operation," the Univac spokesman states.

While Univac foresees a continuing need for drums in real-time applications, one company specializing in drum storage feels that smaller users can gain from using drum storage.

"In lower capacities where fast access and high reliability are required," drums should be considered by users, according to Evered Hinkley, a sales administrator with Vermont Research.

Depending on the nature of the user's system, access time tends to become "critically important," Hinkley says. Most users with 2 Mbytes of storage or less should consider drums, Hinkley believes. A typical 2 Mbyte drum from Vermont Research has an access time of 8.5 msec, he says. This compares with an access time on the IBM 3330 disk system of 30 msec.

Independents Ready 3330 Replacements

(Continued from Page 8)

Ampex's Casey.

"The double density 2314-type disk system gives the user a way to get increased mass storage at roughly a 3330 byte price," according to L.C. Petsolt, national sales manager for Control Data Corp.

But despite the glowing predictions of adding double density disks to the 360s, Petsolt thinks they are presently the best way for a 360 user to upgrade his system.

Even IBM is reported to be aware of the need for a smaller disk system on the 370s. Some observers say that IBM is developing its own equivalent of the 2314 double density disk and others say this type of system has already been offered informally to IBM World Trade users in Europe.

"We don't have that product," an IBM spokesman states. The only version of the 2314 available to World Trade users is the standard 2314 disk system, he affirms.

One of the first 3330 users is Zayre Corp. "We had Memorex 2314 equivalents before. And the 3330 is a different ballgame," Robert Bozeman, DP manager says, pointing to the size of the new disk.

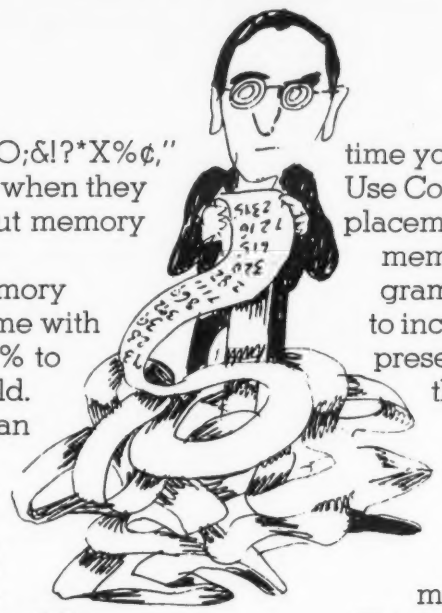
"Our two 3330s, which include 10 spindles with 100 Mbyte/spindle have performed very well," Bozeman says.

"For the small user a 3330 system is just out of the question," Bozeman believes. Despite Zayre's satisfaction with the 3330s he admits considering the independent replacements. "But so far we have not found sufficient difference in the independent systems to warrant our making such a change," he notes.

When Zayre switched to 2314 equivalents before its 370, "we had almost a 25% reduction in costs," Bozeman states. Bozeman says he would have to be assured of about a 20% cost saving plus some performance advantages before switching to an independent 3330 system.

"Our new double density disk pack features chrome trim with white sidewalls as standard equipment."

"O;&*£!?*$X%¢."



A lot of 360 users say "O;&!?*X%¢," or words to that effect, when they discover the truth about memory costs.

The truth about memory costs: The core that came with your CPU costs you 20% to 60% more than it should. For 20% to 60% less than you're spending you can have CorPak memory, built to military specifications, that will match or beat the environmental specs on your CPU.

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Use CorPak for same size replacement of your present memory, without any reprogramming at all. Use CorPak to increase the size of your present memory, up to twice the limits allowed by the mainframe manufacturer, with no more reprogramming than you'd need for the manufacturer's memory.

Thinking of trading up just to get more memory? Don't. Keep your main-frame and use CorPak add-on memory to achieve the same result.

That's the truth. Feel like saying "O;&!?*X%¢"? Go right ahead. Get it out of your system. Most important, get the money-wasting memory out of your system. All it takes is one free telephone call.

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Editorial

Surveillance–1984 Style

Computers have scored again in the battle against privacy.

One person can now be 50 places at once, spying and prying. Presumably, a super version of the new Total Surveillance System would allow one person to be thousands of places at the same time.

The computer polls up to 50 closed-circuit TV cameras and compares the incoming images against a stored image. If they don't match, the system sounds an alarm and stores the new, changed images.

And the system can be very selective. "For example," the manufacturer says, "an entrance monitor can simultaneously compare incoming employees to their personnel file picture or I.D. card picture."

We're sure this new product by the Western Bureau of Investigation, a Torrence, Calif., firm will be a boon for legitimate building surveillance – but its other potential uses make us very uneasy.

'If they won't say whose, we'll all have to disqualify ourselves.'

Letters to the Editor

SS Account Numbers, To Identify or Not?

The question of Social Security Account Numbers as a standard identifier for an individual is, in fact, two questions:

- Should there exist a standard identifier for an individual?
- If so, should the standard identifier be the Social Security Account Number?

If there is to exist a standard identifier, the Social Security Account Number – despite existing laws precluding its use as such – is one of the more appropriate choices.

More to the point is the question of whether a standard identifier should exist. Indeed, most critics of the use of the Social Security Account Number are really concerned with the existence of any standard identifier. I feel that the existing legal restrictions on the use of the Social Security Account Number can and should be enforced until such time as both questions raised above are answered in the affirmative by competent authority.

While competent authority for answering the second question can and should include data processing professionals, the proper roles of data processing professionals in answering the first question are those of technical adviser and of individual citizen.

Arthur F. Kaupe, Jr.
System Design Consultant
Western Institute for Science and Technology
Waco, Texas

SS 'Block' Should Be Year of Birth

The Senate Finance Committee voted March 2 to require all children entering first grade after Jan. 1, 1974, to be assigned Social Security numbers. Why not?

I remember a Social Security Number defined as: first three digits, "area"; second two digits, "block"; and last four digits, "serial."

I have always felt that "block" should have been year of birth.

Malcolm E. Chelman
Minneapolis, Minn.

Exam Questions Lack Definitive Answers

Since the publication of my letter on The Professional Viewpoint Page [CW, Feb. 16] it has come to my attention that some people felt I said Steiner's *Practice Questions* were of questionable authenticity, vague or irrelevant. That was not my intent.

Since taking the CDP exam, I can say Steiner's *Practice Questions* are representative of the types of questions encountered on the exam, and can provide worthwhile practice for CDP candidates.

The problem I was trying to underscore is the lack of definitive answers to many of the CDP exam questions, as posed, due to a lack of adequate parameterization, but apparently that message was lost for several readers.

Patricia P. Watt
San Jose, Calif.

Forum OCR Workshop Can Be Continued

On data entry day at the New England forum there were approximately 50 participants in my OCR workshop. Unfortunately I was not able to meet and talk with all OCR workshop participants on an individual basis. I would welcome further comments or questions. As I stated in my talk, I would be happy to advise anyone considering either shared processor or OCR entry systems.

David F. Tierney
Systems Engineer
State Street Bank and Trust Co.
Boston, Mass.

IBM Should Split Along Plant Lines

There is some confusion about my recommendations [CW, March 1] concerning IBM's operations. I suggested that Adapso request the Justice Department to forbid IBM's sale of computer time at its datacenters because it is in violation of the 1956 Consent Decree which directed that all service bureau operations be conducted only by IBM's service bureau subsidiary, SBC.

I have never suggested that IBM be split functionally, but rather along plant lines, as a permanent solution to the current monopoly situation.

The subject of the potential users' recovery of excess monopoly pricing [CW, Feb. 23] should generate user interest in what they have to gain by successful prosecution of the IBM case by the Justice Department.

Joan M. Van Horn
President
VIP Systems Corp.
Washington, D.C.

SCDP Must Serve DP Professionals

I have followed the DP professionalism issue in *Computerworld* with great interest. The more I read on the subject, the more dismayed I become at the apparent lack of direction by DP people (true DP professionals).

It seems many CDP holders are in reality management professionals. I feel that an organization such as the Society of Certified Data Processors should lead in distinguising between management professionals and DP professionals.

Many law firms and accounting firms are managed by professional managers instead of attorneys or CPAs; the same is true of many DP departments. The Society of Certified Data Processors should seek to serve the needs of the DP professionals (systems analysts, programmers and operators) instead of trying to be another AMA to the management professionals.

Let's stop propagating the idea that a DP professional must move into management to be a success and an asset to his firm.

Robert R. Coffey
Senior Systems Programmer
Grand Rapids, Mich.

IBM Software Plan Covers Partition Use

It was a pleasure to see Kenneth Kert's clear description of IBM's software strategy which may force users to larger core and more expensive CPUs [CW, March 1].

This strategy is not limited to software packages but appears to start with the design of the operating system (DOS and OS) and the selection of an inefficient memory management system based on partitions. For the unwary, partitions waste core and disk space in many subtle ways.

Thus the operating system as well as the software packages can be very expensive in terms of hardware rental.

Those who think that partitions are necessary should note that the designers of Univac's Series 70 (formerly RCA) operating systems did not choose to use partitions and that independent software houses have produced operating systems free of the restrictions of partitions.

Gordon Beckhart
Haddon Heights, N.J.

Green Shoe Has 96K Total Memory

I appreciated being a panelist at the (New England) forum. In the March 1 issue, there were statements made that were incorrect. I would appreciate it if you would clarify these statements.

Green Shoe has 96K total memory (32K original from the leasing company, 64K of core extension).

The response time of our order entry system is about 1/4 second not 4 seconds! (We're kind of proud of that).

Floyd J. Nelson
DP Operational Manager
The Green Shoe Mfg. Co.
Boston, Mass.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

SCDP May Be a Real Success, But Have We Formed Wrong Professional Society?

The Taylor Report
By
Alan Taylor, CDP

The first steps that resulted in the formation of the Society of Certified Data Processors came a year ago, at a hearing in Washington. At issue was the question of whether or not programmers, analysts and other DP personnel were professionals.

A union spokesman was arguing they were not necessarily professionals, and that since they were all very similar in function none of them could be called professionals. Then he said that if the DP industry had something like the CPA, people could tell professionals from non-professionals, but since it didn't have such qualifications, then everyone should be paid overtime. (The hearing officially was concerned with whether or not employers should pay overtime, or whether people in our industry were "exempt" from overtime.)

There were several computer group representatives present. And there was such a qualification – the CDP. Twelve thousand CDPs were then issued, but no one told the union leader about it.

And this failure to speak was the spark that eventually lead to the formation of the Society of Certified Data Processors. After all, if the CDP could be ignored so blatantly, then something was wrong, and the way to find out what, was to get together.

The society therefore voted to concentrate upon technical and professional standards, CDP education and revision and publicity. It has done this.

Its committees have started pilot projects – real work projects, being handled seriously, but still pilot projects – dealing with hardware standards (magnetic tape examination), professional training standards (CDP education), professional output standards (unprofessional activities committee), professional responsibility standards, management responsibility standards (working on Dee Hock's challenge) and professional equipment standards (what should a programmer expect to be supplied with by a professional employer).

So far, it looks as though in each of these areas the SCDPers will advance the state of professionalism – a really magnificent achievement. If only half of these activities can be carried through to fruition, all the work involved in setting up the society will have been worthwhile.

Is CDP Relevant?

But there is one point about these activities that simply cannot be ignored.

None of them – not even the professional training area – really requires the participants to hold the CDP, nor do they directly benefit the CDP holders as such! They are for professionals – and members *of* the society *are* professionals – but nothing they are doing currently could be helped by being joined by professionals.

So, perhaps, what we really needed when Don Collins asked "What do we need?" would have been a professional society to push professionalism as the SCDP has being doing.

The SCDP puts questions like this up to the grass roots for decision. So you are going to be asked to give your opinions. But first, here are a few points that the past few month's experience has shown.

Any new society will cost you more than the $9/year that the SCDP currently charges. (The treasurer is about to suggest that this be changed, so CDPs wanting to join at this price should put their applications in quickly.) The $9 was actually supposed to be $15 anyway, and even that was set up unmindful of the additional costs per head involved in establishing a small society!

The original figure I suggested as the probable dues for the SCDP, $20, seems possible – so this time, for planning purposes, let us suppose that the annual dues for a professional society are $20/year.

The Question for You

Now the question is whether or not a professional DP society, open to anyone who handles his data processing professionally, should be formed to push professionalism in our industry. Subsidiary questions deal with who or what should be allowed to join – whether it should be associated with the SCDP and, naturally, whether you are sufficiently interested in advancing professionalism to join yourself. (see questionnaire)

Joining at this stage and giving that much extra muscle to the movement for professionalism at this critical period will be a great contribution.

The profession has paid you well; joining up and trying to help professionalism will help you repay your debts.

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Have We Formed Wrong Society?

1. Do you think that the current SCDP Society, restricted to CDP holders only, is sufficient for professional matters, or should a more general society of professionals be formed?

- ☐ SCDP adequate?
- ☐ More general society needed?
- ☐ Other (please specify) _____

2. Who should be able to join a general professional data processing society, designed to advance professionalism wherever possible?

- ☐ Practicing data processors?
- ☐ Teachers of data processing?
- ☐ Sellers of data processing?
- ☐ Sellers of data processing hardware?
- ☐ Other (please specify) _____

3. If such a society is formed, do you think that it should be:

- ☐ an associate membership of the SCDP?
- ☐ a joint society with the SCDP (perhaps two divisions of one society)?
- ☐ an associated but independent society by itself?
- ☐ an independent, unassociated society?
- ☐ Other (please specify) _____

4. What do you think the name of such a society should be?

- ☐ The Society of Certified & Professional Data Processors?
- ☐ The Society of Professional Data Processors?
- ☐ The Society of Practicing Data Processors?
- ☐ Other (please specify) _____

5. Should we treat this as an enrollment application for SCDP ($9/year, but going up)? ☐ Yes ☐ No
the new society ($20/year planned)? ☐ Yes ☐ No

Name _____ Address _____

CDP Holder? ☐ Yes ☐ No SCDP Holder? ☐ Yes ☐ No
Professional Position

When completed please send to Alan Taylor, The Taylor Reports, c/o Computerworld, 797 Washington Street, Newton, Mass. 01701. Copies are welcome if you do not wish to cut your issue of the paper.

Letter to University DP Center Director

Dear Deputy Director,

Thank you for your tasteful letter on computer printout paper. I am sorry that the independent tape manufacturers are not treating you in the manner to which you are accustomed, but I do not see that merely because they have failed to answer a telephone call you should stop bothering about potential advantages of their products. After all, there are other ways of doing it.

I realize you probably cannot afford to spend the time I do – going into factories, etc. So, just to check out my thoughts that the data was really available to you, I went to the Computer Users' Forum and Exposition in Boston, to see what an ordinary professional could use as his basis of knowledge.

Calcomp demonstrates new disk drives at Caravan exhibit.

Visit Suppliers

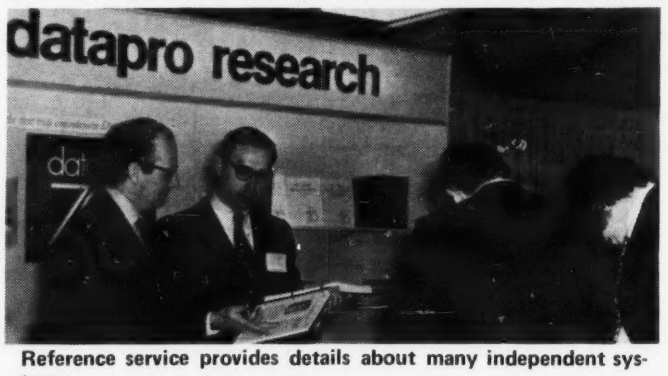
Here is the first exhibit I came across, the new Calcomp drives. They are available in your town, I found out; there even is a service area there. I asked about the investment protection on upgrade, which was what you were saying was not really important because it was only of value to the owners. Calcomp answered that of course it would provide it – just as it had been doing for years on its disk drives when the user converted.

Taylor Thoughts

(You didn't ask about disk drives – but I think you are still using IBM drives, so presumably you have checked out competitive offerings. It is surprising you did not know of this common feature of the many independent contracts).

Use Reference Services

Well, that was useful information, and easily available. But while it might suggest that one independent was worth looking at, it really did not give full details of all of them. That is what a reference service provides.



Reference service provides details about many independent systems.

Sure enough, a little distance away I found a reference service, Datapro 70. Here Burt Totaro showed me details of many independent systems. True, the service does not give the answers to the upgrade point, but it does provide the addresses and phone numbers of the head offices, and I am sure your calls would not go unanswered there.

Not that it is necessary for Datapro subscribers to call, Totaro told me. There is a telephone request service which will gather the information and send it to the subscriber. In fact, at my request, he is gathering the information and if you like, I will send it to you. Although with your order already into IBM, perhaps you would prefer not to know.

Naturally, there is a third way to find out information – by asking around. I did not particularly want to go out to the Great Lakes just to check out whether you could have done this successfully, but luckily at the Computer Caravan I found an installation listing which showed that a number of your local places have them installed! Have you tried your city hospital? Or that very big firm? It didn't take long, and it could have given the information you need.

Personally, I think if these matters are part of your responsibility you should have been able to get the information, rather than make any decisions in ignorance. I think your efforts to do so were apparently as shallow as your thinking when you said that "only the owner is hurt" by not having protection on investment during upgrades.

Not merely isn't it true – the user is hurt with increased charges also – but you also forgot when you were addressing a taxpayer you were effectively addressing one of your subsidizers, if not your owners.

And I don't like being hurt unnecessarily.

Very truly yours,
Alan Taylor

Meet the mind expander. Monolithic Main Memory from ITEL.

Now there's an easy, economical way to expand IBM System/360 or 370 memory: add on Monolithic Main Memory from ITEL. (The Monolithic Main Memory is manufactured to ITEL specifications by Advanced Memory Systems of Sunnyvale, California.)

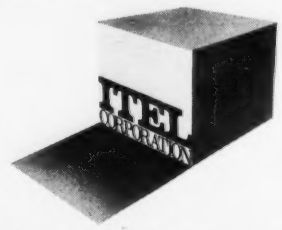
This monolithic memory lets you upgrade core at a lower price than core. It's far more reliable than core. And you can maximize capacity. For example, you can expand the 360/30 to 128K, the 360/40 to 512K, the 360/50 to 1024K and the 360/65 to 2048K. For the 370, we match IBM byte for byte, and offer substantial savings in cost and space.

The secret of ITEL's superiority over IBM core is found in its basic monolithic memory module. This semiconductor chip contains 1024 bits of storage. These memory elements are fabricated in batches of thousands, which cuts costs dramatically. And most wired interconnections are eliminated, so there are far fewer potential sources of failure.

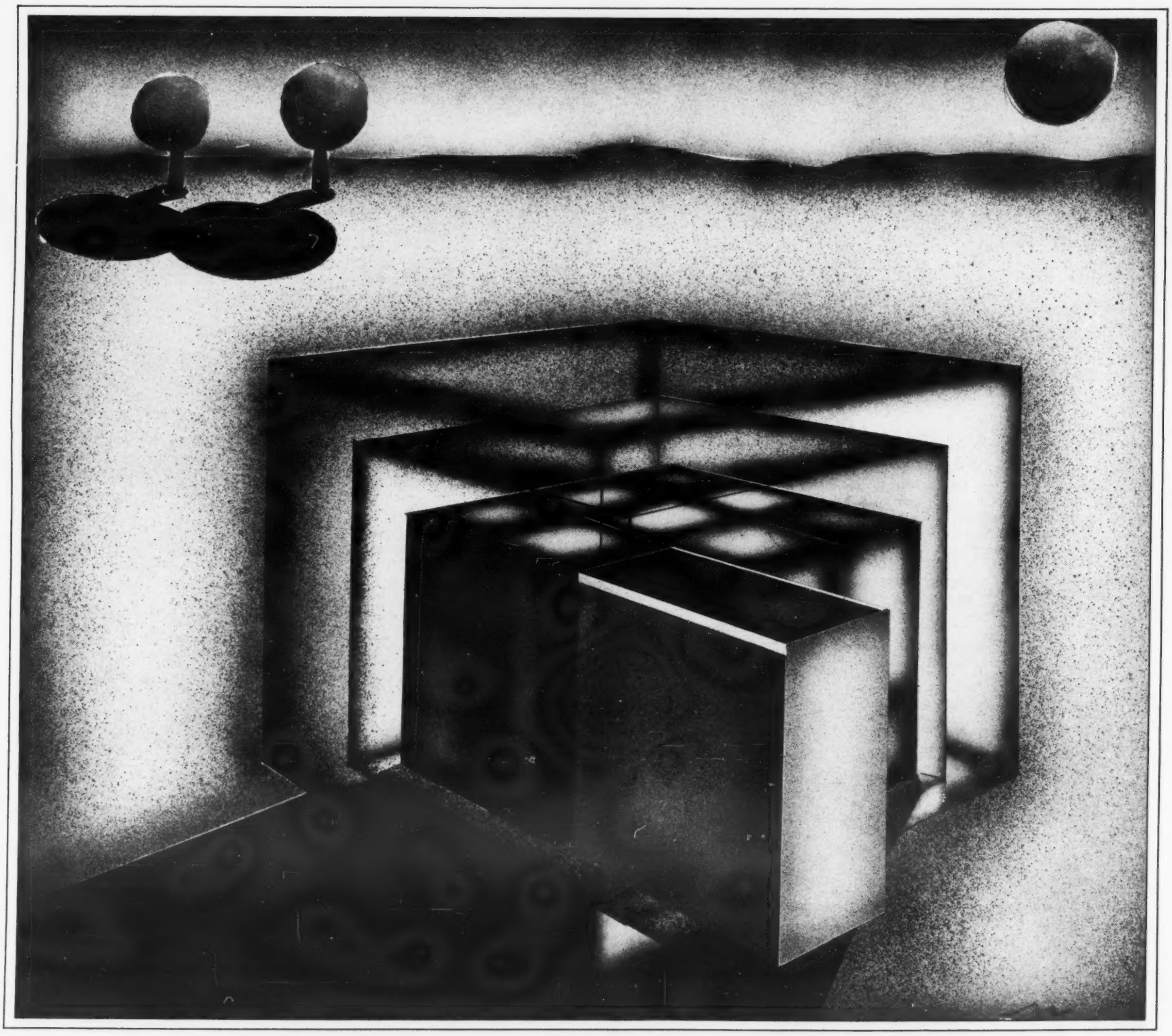
But even monolithic memory elements can sometimes fail. That's why ITEL has ECC: Error Checking and Correction. Should a memory element fail, ECC corrects the error instantly. There is no effect on computer operations or processing. The operator is notified by an error light and maintenance can be performed without interrupting the memory's operation.

The Monolithic Main Memory from ITEL means savings in cost. Savings in speed. Savings in maintenance. And, in some cases, savings in floor space. It's completely compatible with IBM System/360 and 370. Handles all memory size changes. And it can be leased as well as purchased, so you can meet your immediate memory needs now without a large outright purchase.

ITEL is out to improve the system. With technical advancements. Complete corporate sales support. National field service. Around-the-clock maintenance. And with the people and financing policies that can create a customized solution to your particular problems. So meet all the ITEL mind expanders at your nearest ITEL office.



ITEL Corporation, DPG, One Embarcadero Center
San Francisco, California 94111, Phone: (415) 989-4220



Random Notes

On-Line Extends Support For Electrical Engineers

PITTSBURGH – The Electrical Engineering Library (ELI), now available on the On-Line Systems Inc. time-sharing network, contains 18 separate programs and is said to be one of the few libraries covering the entire spectrum of electronic and power circuit design.

The ELI program lets the user simulate and test almost any engineering idea without wasting time on hand calculations or programming steps. The system includes both linear and non-linear circuit analysis, as well as microwave circuit analysis and programs for RF filter design. On-Line Systems is at 4721 McKnight Road, 15237.

'Pro/Test' Now Available In Version for HIS 600/6000

BURLINGTON, Mass. – Synergetics Corp. has released a version of the Pro/Test data generator package for the Honeywell 600/6000 series of CPUs. Developed in conjunction with Northwestern Bell Telephone Co., Omaha, Neb., the generator uses free-form input parameters which can be entered in terminal or batch mode.

Output files can be generated on disk, drum, tape or cards and records may be blocked or unblocked, in fixed or variable length. Drum and disk files can be linked at random and all files may contain multiple record formats. Both records and fields may be conditionally generated, the company said from One Garfield Circle, 01803.

'Nastran' Installed on Sci-Tek

WILMINGTON, Del. – Nastran, Nasa's structural analysis system, is one of three major programs recently added to the Sci-Tek, Inc. time-shared library. It provides a range of applications extending to almost any kind of construction and makes use of seven generalized elements for modeling the structure, Sci-Tek said.

A new release of the General Purpose Systems Simulator (GPSS) has been designed to take advantage of features on the Univac 1108. GPSS II models and GPSS/360 models can be used with only minor changes. Ansys, a program for analysis of heat transfer, static, dynamic and plastic structural stresses, is also available, the firm noted from 1707 Gilpin Ave., 19806.

$8,000 Data Base Management

System Backs Host, Query Languages

By Don Leavitt
Of the CW Staff

MONROEVILLE, Pa. – A relatively inexpensive data base management system, Qwik-Scan from Applied Systems Associates Inc. (ASA), can provide DOS or OS/360 users with both host language and self-contained query language capabilities.

Qwik-Scan is made up of three modular subsystems. The File Builder System is used to organize the user's files and subfiles into a coherent data base system, with inverted file structures for rapid access to desired elements and compressed data for optimization of storage space.

The Host Language Subsystem allows the trained programmer to access Qwik-Scan file maintenance modules at the Call level, from programs written in BAL, Cobol or Fortran, The Self-Contained Subsystem allows the non-programmer user to maintain, retrieve and report from his own data base through near-English instructions.

Because the structure of the data base is transparent to the user, changes in data field content, size, structure or relationship to other fields can be made on the file builder level without reprogramming of the application systems, a company spokesman noted.

Global Modifications

The search techniques in Qwik-Scan are said to let the user examine or retrieve an entire range of data in the same time that other systems might find one item. At the same time, file maintenance is optimized through the support of global modifications, according to ASA.

Qwik-Scan will operate on any IBM 360/370 CPU with 65K bytes of main storage and two direct access devices, as well as card reader, console typewriter and printer. It operates in batch mode under DOS and OS now, and a teleprocessing version is under development.

ASA is at 300-201 Monroeville Mall, 15146.

New Security, Efficiency Features Available on GE's T/S Network

BETHESDA, Md. – Business-oriented users of the GE Time-Sharing Network now have new capabilities designed to add security and efficiency to their operations.

Subscribers concerned with the basic security of their data passing through the network facilities can use an enciphering/deciphering program, called Scram, which leaves the data in completely unintelligible form while it is out of the user's control.

The Journalization command feature can be invoked to create a file, on tape or disk, of all transactions as they are passed against a user data base in real time. This file is available as backup for reprocessing if needed.

GE has improved its file-sharing capabilities so that users with several locations may gain virtually simultaneous access to a single network data file.

Users apparently will be able to avoid the bother and cost of periodic accessing of programs, just to determine whether there has been any change to the data, through the Wake and Sleep modes of operation. Sleep is the standby mode which, in effect, prevents a user from accessing a program on which no changes have occurred.

Wake is the ability of a second program, even from a different location, to signal that a change has taken place and to reactivate the sleeping program for the interested distant terminal.

GE has also added archival storage of magnetic tape files which can be returned to the system on an overnight basis, and scratch files for dynamic temporary storage of data during a program run.

'Fortredit' Cleans Up Fortran

WASHINGTON, D.C. – DOS or OS/360 users with approximately 40K bytes of available storage can perform clerical cleanups of their Fortran programs, without additional debug cycles, with the Fortredit package from Computation Planning Inc. (Complan).

The Complan package can be used with source code from any of the 360 Fortrans through H, Option 2. It functions in either of two modes or in a combined mode, the company said.

In Resequence mode, Fortredit produces, as output, new source code in which statement numbers, continuation card numbers and identification sequence numbers are all placed in ascending sequence, regardless of how mixed the original input might have been. Each reference to a statement number within the source program is changed to the corresponding new statement number, a Complan spokesman said.

In Rename mode, the package changes the names of all designated subprogram references within a Fortran program to a corresponding set of names, provided through a table of present and desired name pairs.

Resequence Control

Fortredit is said to control the resequencing of more statements, and more continuation cards than similar Fortran source updating packages from other vendors. The Complan package also handles longer statement numbers than the other packages, the company claimed.

Insertion and deletion of End-of-Batch (EOB) symbols is not a standard feature of Fortredit, but is available as an extra-charge "maintenance change" for those users who want it.

The basic package sells at a fixed price of $500 for a permanent usage license for a single location.

Installation and application assistance are extra-cost options, Complan said from 5401 Westbard Ave., 20016.

'Comput-A-Charge' Bills Usage

CHERRY HILL, N.J. – Billing for system use by job in a multiprogramming environment is a byproduct of normal operations on medium scale or larger IBM 360/370s, with the Comput-A-Charge module from Value Computing Inc.

Interfacing with the Job Accounting module included in DOS Release 25, or with the SMS coding under OS/360, the package produces a daily summary of jobs handled, idle time report and graph of multiprogramming utilization of the CPU. Use of peripherals is reported by device and by class of device.

Reports for longer time periods consolidate data for a number of days, and for a number of CPUs, to provide summaries for an entire installation.

Comput-A-Charge requires about 90K bytes of transcient core under OS/360 and is available for $6,000 under a perpetual lease, which permits its use on up to 20 CPUs at the same physical location.

Value Computing Inc. is at 383 Kings Highway North, 08034.

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360-370 TEST FILE GENERATOR

TESTCUBE creates up to 99,999 records for tape, disk, data cell, seq or IS with only a few control cards. Random or controlled data, automatic increments/decrements, control totals, exception conditions. In operation 3 years. 360/370 DOS. Price $3,000.

Contact H. Dick Breidenbach
Computer Services Corporation
23225 Northwestern
Southfield, Michigan 48075
(313) 444-5030

Model 28 TTYs Join Water Pollution Fight

MADISON, Wis. – While Model 28 teletypewriters may be old-fashioned for some users, they are playing an active part in helping monitor water pollution levels for the Wisconsin Department of Natural Resources.

Sensing devices at 11 points along the Wisconsin and Fox rivers automatically monitor such parameters as dissolved oxygen, temperature, conductivity and other factors which contribute to pollution. The gathered data is transmitted to a 370/155, with on-line disk storage.

The sensing devices are supplied by the environmental systems center of Raytheon. Designated the AES-1200, the remote devices gather data on

Communications

command from the Model 28 in Madison. As data is received via remote "telegraph carrier lines" operating at 55 bit/sec, a hard copy is printed out on the TTY while data is entered into the CPU. Each sensor includes an automatic-answer modem, according to a state spokesman.

A 360/20 at the Department of Resources acts as a satellite to the Model 155 to access the data base and evaluate changing trends in the quality of river water. The CPUs work together to produce maximum and minimum hourly values for each parameter monitored. Average readings are produced daily, weekly and monthly.

Since the state already had the Model 28 TTY, a low-speed system seemed to be the most feasible way to set up a water monitoring system, according to John Fodor, a systems analyst with the Department of Natural Resources.

"Because we get 24-hour surveillance, we feel we have some solid documentary evidence to support our orders to correct processes that are polluting the waters," said Thomas G. Frangos, administrator of the state Division of Environmental Protection.

The Department of Natural Resources has issued "cleanup orders" to a number of industries and municipalities along the rivers, based on the data being gathered and interpreted

ut1

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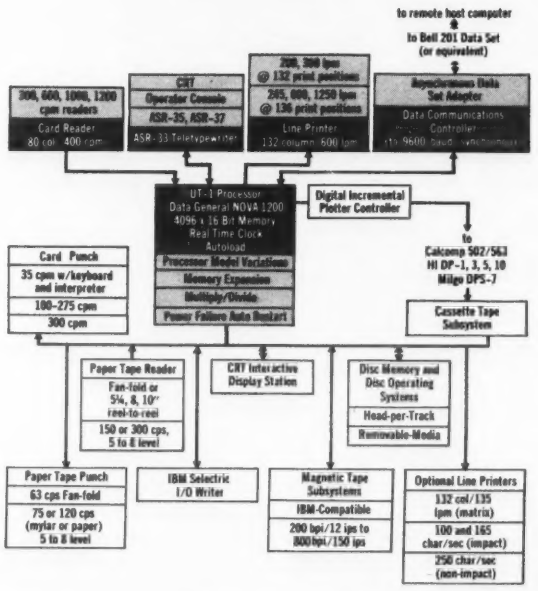

It's no easy job patching together a communications network with bits and pieces from various terminal manufacturers. But that's just what you're up against if you have even one "custom" or "unique" requirement.

That's why the UT–1 is news. You configure it the way you want it. For less than $1000 per month, you can have the standard terminal with a high-speed, 16-bit, 4K NOVA 1200 computer, 600 LPM line printer, 400 CPM card reader and teletype. (If you already have the NOVA, we'll deliver the rest.) The real kicker is in the diagram at the left . . . all the optional peripherals available through our modular design approach.

The UT–1 will communicate with the major manufacturers time sharing systems including the IBM 360 and 370, Univac 1108 and Control Data 6000 series. It's operational now in cities throughout the U.S. Contact Unitech for literature and details on leasing, purchase and maintenance.

unitech, inc
1005 East St. Elmo Road, Austin, Texas 78745 512/444-0541

Bell Feels Heat Of Competition; User to Benefit?

CHICAGO – Telephone company data users may soon get better maintenance and other services because of increasing pressure from Bell's competition.

An article urging Illinois Bell employees to agressively compete for the customer's business was included in the January issue of Illinois Bell Magazine. Called "Competition Here and Now," the article spells out how the telephone company will work to provide service to its users.

"The competition has some strong points," the magazine says. "They're flexible and they offer lots of options. A customer can buy equipment outright (although few do), or lease it, perhaps with an option to buy later.

"There are always a few [users] who want to own their equipment, or who just want something different. Some have had an unfortunate experience with Bell service and are hoping to find something better," the article says.

"While [Bell's] systems sometimes seem more expensive . . . we come out looking better, or just as good considering the 'hidden costs' that competitors often don't mention," the magazine says.

"Our competition knows us well. Many of their staff are former Bell employees," the article says. "The customer could benefit most from competition. Because they [now can] go elsewhere, they're happier with [Bell]," the article claims.

The issue on competition reviews regulatory events leading to significant FCC rulings. In addition, it lists 20 questions which customers are urged to think through when considering competitive carriers.

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Bits and Pieces

Diablo Disk-Based System Mated to PDP-8, PDP-11

SUNNYVALE, Calif. – Systems Industries has developed controllers and power supplies that allow the use of Diablo disk drives with DEC minicomputers.

Both the Diablo Model 33, high-density dual platter drive and the Model 31 single cartridge disk can be used in the systems. The systems can be interfaced to either the DEC PDP-11 or most of the PDP-8 family.

The Model 33 system for the PDP-8 minis sells for $12,550, while that for the PDP-11 costs $12,350. Capacities are 3.2M 12-bit words or 2.4M 16-bit words.

The Model 31 systems for the PDP-8s hold 1.6M 12-bit words and sell for $10,150. Similar systems for the PDP-11 store 1.2M 16-bit words and sell for $9,950.

All systems include the disk drive, controller, power supply and interface hardware. Systems Industries is at 535 Del Rey Ave., 94086.

Cassette Replaces Tape on PDP-8

WALTHAM, Mass. – Designed for direct paper tape replacement, the Kydek cassette system from Kybe Corp. is available for users of DEC's PDP-8/e minicomputer. The two transport cassette system is compatible with the PDP-8/e and with DEC's standard software, and is designed to replace the paper tape reader and punch.

Deliveries of the Kydek for PDP-8/e users begin the second quarter of 1972. Price is $3,495 and delivery is 30 to 60 days.

System Automates Tape Libraries

MOHAWK, N.Y. – Advanced Digital Systems, said it plans to release a low cost librarian transportation and record-keeping system for automation of tape library operation. It is expected to be priced as low as $620/mo for an active 1,000 tape library for the tape movement hardware and librarian software and at $125/mo for the librarian software alone, the company said.

Work Station Includes Storage

VERONA, Pa. – A work station from Terminal Accessories Co. features an integrated paper supply, storage space and is available with optional casters. The Model 2440-D is priced at $110 and is available on 30-day delivery from 153 Fox Chase Drive, 15147.

'Shortchange' Users

Noisy Powerlines Make CPUs Erratic

By Frank Piasta
Of the CW Staff

PITTSBURGH – A time-sharing minicomputer that "shortchanges" its users because its digital clock runs "fast" could become a common problem if minicomputer use and incidence of noisy power lines increase.

The time clock, operating on the normal 60 Hz powerline voltage frequency, counts the number of times the powerline voltage passes through zero.

A noisy powerline with additional high-frequency signals can increase the count to make the clock run as much as three to four times faster. Since the noise can change character when new machines are added or taken off line, the clock's behavior would reflect these changes and behave in an erratic fashion.

Noisy Powerlines

Noisy powerlines were at fault during the recent installation of an independent add-on memory. The installation proceeded smoothly until the power was turned on. The powerline problems, caused when the called-for dedicated line was used by two other devices, delayed the installation by at least two days.

One solution is the installation of a dedicated power source with no other devices attached. This, however, would not be effective in areas where the lines can be influenced by outside noise caused by switching transients and harmonics from large electrical apparatus. This relatively expensive solution also is restrictive in plant reconfiguration or reorganization, requiring dedicated lines to be rerun.

Another solution involves the use of a Westinghouse SW power conditioner inserted between the powerline output and the computer.

Power Conditioner

The power conditioner is designed to precondition powerline voltage before it enters the system. It stabilizes the voltage into the computer, isolates and shields the input from powerline output, provides built-in short circuit protection and overload protection.

The SW power conditioner, Westinghouse said, has three advantages over other methods; low cost, simple installation requiring no modification of the computer, and protection from such dangers as lightning, overvoltage and short circuits.

The SW power conditioner is produced by the Westinghouse Specialty Transformer Division and is available in five ratings including 120-, 250-, 500-, 1,000-, and 5,000 VA. The first four are priced from $150 to $500 and are available from stock. The 5kVA model costs about $5,000 and can be prewired for three-phase powerlines. Delivery is four to six weeks.

DEC Minicomputer Users Offered 2 Solid State Add-On Memories

Two manufacturers now provide add-on solid state memories for users of DEC minicomputers.

The MT-311 memory from Memory Technology, Inc. is designed for the DEC PDP-11.

Users of the E and I models of the PDP-8 can attach solid state memories from Signal Galaxies.

In addition, Signal Galaxies said several models of its memory will soon be available for the Honeywell 516 and 316 and other minis.

The Memory Technology unit boasts high speed and a wide range of capacities, fully compatible with all announced models of the PDP-11. It is designed to mount directly in the standard rack and connects to the mini's Unibus structure.

System speed is 450 nsec for read access, 600 nsec for read cycle, 800 nsec for write cycle and 400 nsec for the write portion of a read/modify/write cycle. Storage is available from the minimum 4K, 16-bit word configuration to 28K words in a single 7-in. enclosure. The memory is field expandable.

An 8K system with power supply and rack mounting sells for $4,990.

Both the PDP-8E and PDP-8I memories from Signal Galaxies are plug compatible with the DEC memories. The PDP-8E memory plugs directly into the mini's Omnibus and is available in 4K to 28K in 4K increments and uses the existing DEC power supply.

The memory for the PDP-8I mounts directly in the mini's rack assembly and has its own power supply. Memory sizes range from 4K to 24K words in 4K increments.

The first 4K of memory for the PDP-8E sells for $1,630 with each additional 4K priced at $1,200. Delivery is 45 days. Memories for the PDP-8I are priced at $3,920 for the first 4K and $1,200 for each additional 4K module. Delivery is 60 days.

The speed of the memories, according to Signal Galaxies, is fast enough so that the required refresh operation plus a read or write are carried out within the normal cycle time. The CPU is unaware of the refresh operation, the company said, and no memory access conflicts occur due to the refresh operation.

Memory Technology is at 83 Boston Post Road, Sudbury, Mass., 01776. Signal Galaxies is at 6955 Hayvenhurst Ave., Van Nuys, Calif., 91406.

Up to 2M Bytes

360/65 Core Memory Available

STAMFORD, Conn. – Data Recall memories to expand the 360/65 system to twice its original maximum capacity are available from Computer Investors Group, Inc. (CIG).

Memory sizes for the add-on units are sufficient to raise the total system capacity to 2M bytes compared to the maximum of 1M available from IBM. The minimum Data Recall memory size is 256K bytes, equal to the minimum memory of the 360/65.

The compatible memory units operate at the cycle speed of the CPU, CIG said, and require no changes in software or operating procedures.

The memory unit can be taken off-line without interrupting the CPU by means of an on-line/off-line switch. Each unit is equipped with its own memory tester, maintenance panel and power supply. The use of integrated circuits, plug-in cards and core stacks reduce maintenance and repair time, CIG said.

A minimum Data Recall memory, to raise the capacity of a 256K 360/65 to 512K bytes, is $5,625/mo plus $400/mo maintenance. Purchase price is $184,800.

The maximum system, which increases the capacity of a 256K byte 360/65 to 2M bytes, has a lease price of $25,855 plus $1,600/mo for maintenance. The purchase price is $874,000. In addition to the one-year prices above, longer-term leases are available. Delivery is 90 days from 65 Washington Ave., 06902.

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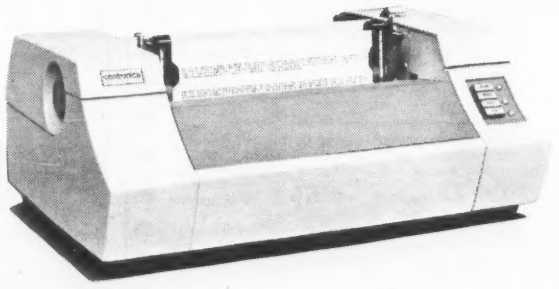

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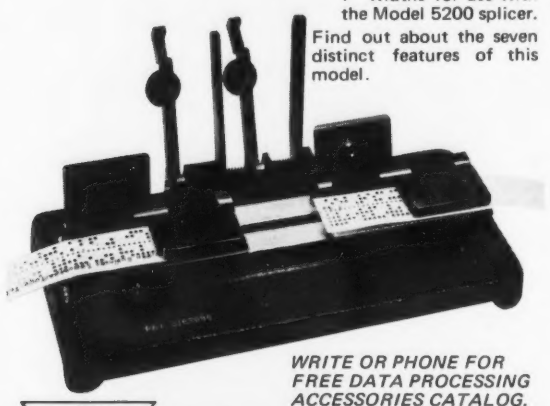

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Recycled Heat

Computers, Lights Keep Building Warm

By Joseph Hanlon
CW Correspondent

PLYMOUTH, England – Heat from computers and electric lights keeps a new office building so warm that there is no need for a traditional heating plant. The ventilation system is designed to take the hot air from the computer room, filter it and recirculate it to other parts of the building.

15% Glass

The new accounting office of the South Western Electricity Board has been specially designed to recover and reuse as much heat as possible. The walls are well insulated and the number of windows has been sharply reduced; older office buildings have 25% of their outside wall space as window, and new glass buildings go above 50% window. This building is only 15% glass.

The building will house 350 employees. Engineers estimate that the inside temperature will remain at 70° even if the outside temperature falls to 16°. This will require 340 kW of heat (a typical electric space heater is 1 or 2 kW). Electric lights will provide 180 kW and the building occupants another 25 kW.

The twin 360/50s will provide 45 kW of heat, and the transformers and other power supply equipment for the computer will provide 25 kW more. The rest of the heat will come from other machinery in the building.

In effect, the computers and their power supplies raise the temperature inside the building by nearly 20°.

The Electricity Board is not the first to use computer heat, however, IBM's Information Services Ltd. in Havant, England, uses heat from several computers to provide one-third of the warmth needed for winter heating. The three-story building has windows only on the top floor, which reduces glass area to around 20%.

Both buildings require extensive air conditioning, although the reduction in window area means less sunlight comes in, which reduces the air conditioning load.

Screw Machine Companies Get T/S

CLEVELAND – The computer has arrived at automatic screw machine shops throughout the country because of a time-sharing program developed by National Screw Machine Products Association (NSMPA).

Four screw machine product companies have already begun using the system, based on low-cost computer time-sharing.

Last year the NSMPA commissioned Leasco Response Inc. to develop seven basic programs that answer essential estimating and cost control needs in screw machine shops. These include reports on job estimate; factory labor; machine hour; machine utilization; machine downtime; employee efficiency; and job cost analysis.

The programs are available to NSMPA member firms as well as non-member companies that pay a special assessment for using the programs. The association paid for all the development work and computer programming.

Today, a company that subscribes to the NSMPA computer program merely installs a teletypewriter on its premises. Confidentiality of information is assured through a password system completely under the control of the subscriber, which prevents an outsider from getting into his data files. The subscriber can change his password as often as he wishes.

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USL Grants PhD in Computer Science; LSU, Southern Exchange DP Faculties

BATON ROUGE, La. – Three universities in this state give some indication of how courses in computer science are taking hold in higher education.

The University of Southwestern Louisiana (USL) is the only university in the state to offer a doctorate degree in computer science. USL has also relaxed its admissions policies so that "almost anyone" with a Bachelor's degree may enter its graduate programs, a professor told a DPMA meeting recently.

Meanwhile, the computer science faculties of Louisiana State University (LSU) and Southern University are exchanging classrooms in order to teach the same undergraduate course in assembler programming at the two schools.

USL has had a Master's degree program for DP for six years, and started its doctoral program three years ago, Dr. Barry Bateman told the DPMA. Twenty-four students are in the PhD program.

Education

Even students with "not so good" undergraduate records are allowed to enter USL's graduate programs, Bateman explained, if they are seeking more education after working for some time since they graduated from college. The university offers business or research-oriented curricula, he said.

USL has 235 undergraduates in its computer science program, in operation for eight years. LSU, on the other hand, has only 80 students in its undergraduate course, which started this year. One of the LSU sections is taught in the evening.

Fifteen students are enrolled in the course at Southern.

At both LSU and Southern, the course is required for computer science majors but is open to students in other fields, and to interested people from outside the universities. A prerequisite for the course is a basic knowledge of computer fundamentals.

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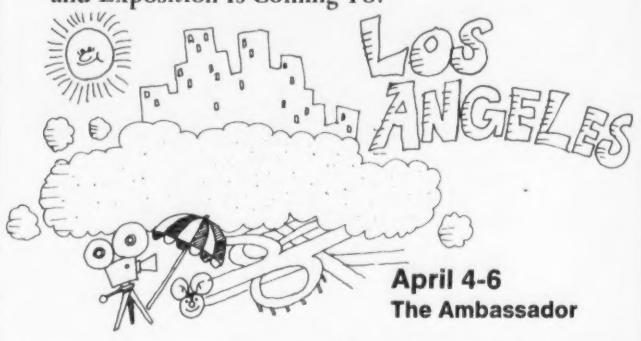

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Students Use 9100A To Count Town Vote

Special to Computerworld

KENT, Wash. – Two Kent high school students played an important role in a recent election here.

The students had taken a course in computer mathematics offered by the Kent School District using the Hewlett-Packard 9100A desk-top programmable calculator. The election board asked them to use the 9100A to produce ballot totals and summaries.

They became part of the election supervisory team and wrote a program to produce both interim and final ballot totals. Their computed totals became the official election results.

Other election officials, however, used a conventional adding machine.

PC Concepts Taught By Book or Course

Users can gain an understanding of process control computers by attending a three-day workshop at the University of Wisconsin in May, or by reading a 12-page booklet prepared by Computer Science Corp.

"Software: the Heart of Automated Process Control" discusses the function and division of responsibility between application and real-time executive programs. The booklet is free and can be requested from CSC at 9841 Airport Blvd., Los Angeles, Calif. 90045.

The Wisconsin course is more technically oriented and is sponsored by engineering extension and the electrical engineering department. It is scheduled for May 2-4, and includes demonstrations on a PDP-11. Program Director David P. Hartman is at 432 N. Lake St., Madison, Wis., 53706.

AEDS Releases Guide

WASHINGTON, D.C. – The Association for Educational Data Systems (AEDS) has recently published a *Layman's Guide to the Use of Computers.*

The emphasis of the guide is on instructional applications, showing how computers are now being used and can continue to be used to help in the educational process. It is designed to provide teachers, administrators, school board members and parents with an introduction to data processing and to present an overview of the use of computers in instruction.

The publication is available at $3 per copy, (10% discount for quantities of 10 or more) and may be ordered from AEDS, 1201 16th St., N.W., Washington, D.C. 20036.

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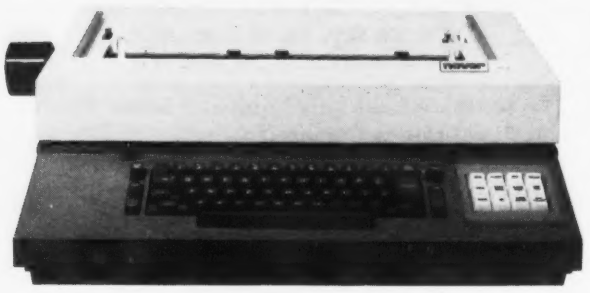

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GTE INFORMATION SYSTEMS INCORPORATED

Firm Axes Computer for Clerks

By Joseph Hanlon
CW Correspondent

LONDON – As managers look for ways to save money in the data processing areas, some are replacing the computer with people.

Blue Sky Air Holidays hopes to save $200,000 a year without a computer. "You need twice as much staff to have the pleasure of playing with the computer," declared Duncan Haws, Blue Sky's managing director.

Blue Skys was one of 10 package tour companies using the Tour Pack system for accounting, printing bills and confirmations and preparing plane and hotel lists.

Slow Turnaround

Tour Pack is run in batch mode and in Blue Sky's case there were only two runs a week on its parent company's ICL 1902A. The slow turnaround time caused serious checking and error correction problems.

Each change required the entire previous booking be cancelled and reentered, a time-consuming process that increased the possibility of still more errors. Minor mistakes fouled up the accounting part of the system and the last audit required three months to unravel the mess, Haws said.

Often it required two weeks to get a correction through, Haws said, which sometimes meant inaccurate bills for travel agents and incorrect flight lists.

Demand for Accuracy

The demand for accuracy slowed down the entire operation, Haws declared and by the time he got rid of the computer, "we had 30 extra staff just feeding this voracious animal."

Clerks now keep simple paper lists of tours and accounts, and changes can be made with a pen.

If the company had grown as expected, the computer would have been a necessary evil, Haws said.

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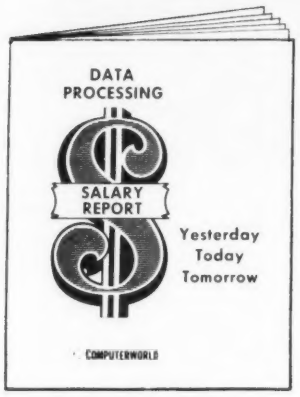

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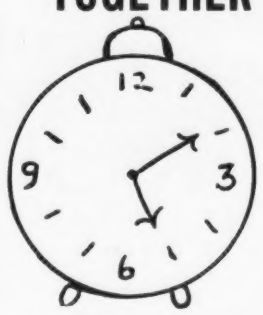

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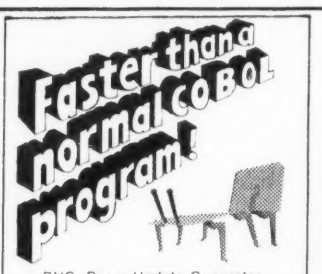

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computer industry

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March 15, 1972

CI Notes

Japan, Europe Firms Meet

Dempa Publications, Japan

TOKYO – Discussions are under way here between the president of Compagnie International Pour l'Informatique (CII) and officials of the Hitachi-Fujitsu group and Mitsubishi Electric Co. Ltd. concerning cooperation on sales and development of computers between European and Japanese firms.

Meetings will also be held with the Japanese Ministry of International Trade and Industry (Miti).

Miti officials regard this visit as a preliminary step toward a Japan-Europe allied computer front against IBM.

CII, Siemens and Philips recently announced plans to merge their computer operations [CW, Feb. 9].

Xerox Merges DP, Copier Units

STAMFORD, Conn. – Xerox Corp. has merged its unprofitable Xerox Data Systems with its Xerox Business Products Group and realigned the units into three new operating groups headquartered in Rochester, N.Y.

Separate field sales forces for computers and copiers will be maintained.

The move will give "even greater attention to the computer and its significance to the future of Xerox," noted C. Peter McColough, chairman and chief executive of Xerox.

ICL Gets New Canadian Head

TORONTO, Ont. – International Computers of Canada Ltd. (ICCL) has also experienced a changing of the guard, following the installation of a new chairman at ICL [CW, March 1]. The president's duties were assumed by G.D.C. Hicks, deputy manager of ICL's international sales organization and a vice-president of ICCL, following the resignation of James E. Bieser as president and director.

CA Horn Turned Off

NEWPORT BEACH, Calif. – Computer Automation's horn has been shut off by local police here after complaints from neighbors.

CA President David Methvin used a large horn on the company's production building to signal the receipt of every $10,000 worth of minicomputer orders. Neighbors complained after the firm landed a recent order for $250,000 – good for 25 blasts on the horn.

"Maybe it's just as well," Methvin said, "we just received one order in excess of $1 million."

Supershorts

Graham Magnetics Inc. has agreed to sell to Asahi Chemical Co., Ltd., Tokyo, the technology on its "Epoch 4" magnetic tape.

– – –

Initial quantities of the first Isoplanar ECL memory, the Fairchild 95410, are being shipped by the Digital Products Division of the Fairchild Semiconductor Components Group.

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Bunker Ramo Corp. announced a joint venture with the C.W. Tyree Holding Co. Pty. Ltd. to form a new company in Australia. The new firm, Amphenol Tyree Pty. Ltd., will make electronic components.

Search for Product Lines

Gould Sets Sights on I/O Market

By E. Drake Lundell Jr.
Of the CW Staff

NEWTON, Mass. – While several firms have been developing into "mini-conglomerates" in the memory area of the computer field, Gould's Data Systems Division here is attempting to establish such an organization in the area of input-output equipment.

"We feel that the major growth area in the computer field will be in the areas of input-output since there is an overcapacity of mainframe power at present," according to T. Paul Bothwell, vice-president of Gould and acting director of the division.

Presently the firm has established itself in the key-to-tape area with the Sangamo line that it acquired, in the printer market with the internally developed 4800 printer/plotter, and in the computer-output microfilm market with the recently acquired Beta Inc. COM line.

Acquisition Plans

The firm is presently looking at the key-to-disk market and will probably get into this field through acquisition, according to Bothwell.

Industry sources indicate Gould has negotiated with both Entrex and with Redcor for acquisition of their key-to-disk lines, but the firm wouldn't comment on candidates for acquisition.

"I would expect us to get into the key-to-disk market in the next couple of months," Bothwell said, but he indicated the product would have to have communications capability.

The next move for the firm in the communications area will be to offer an intelligent terminal-like device and the firm "will probably have to buy or merge" with a company that makes these devices, according to Bothwell.

The intelligent terminal market was hurt by the recent recession, according to Bothwell, but it is still a growing market, just about to "take off" now.

A great deal of venture capital was poured into this area, he said, forcing firms to develop products to a large extent before the user was ready to fit them into his systems. The rate of growth in the market, he added, will largely be determined by the economic climate over the next few years.

Because of the economic recession, the growth will be less pell-mell in the future, he said, and the users will evaluate not only the equipment but the manufacturer more carefully in the future.

The firm is looking at off-line data handling systems in the output area, Bothwell said.

IBM is more tolerant of off-line systems than it is of plug-compatible output systems, and a company that can offer a self-sufficient product is better off than one that competes directly against an IBM product, he said.

In this area, COM is experiencing a 15% a year growth rate, Bothwell said, but it often forces the user to change his system to fit the requirements of the COM systems.

The growth rate in this area will be faster, he said, if the systems can be adopted to user needs more effectively, and if the need for automatic microfilm retrieval systems can be satisfied, Bothwell said. These automatic retrieval devices, which Gould is considering, would also have to be low priced, he said.

Gould is also looking at impact printers in addition to its line of non-impact devices, he said.

The recession of the past year has helped in the search for companies with good product lines and had some effect on Gould's decision to begin building a wide product base, he said.

Fair Deals?

With the recession, companies searching to take over product lines were able to get fair deals in the marketplace, he said, since many firms with good products and technical ideas were not able to get the financing they needed to stay in business.

However, Gould is looking for "product lines, not companies," he said, in its move to differentiate its base in the input-output marketplace.

By 1975, a company will probably need to have revenues of around $100 million per year in the computer industry in order to stay viable, he said, adding, "We're aiming for that."

Exhibitors Like Caravan Concept, Cite Numerous Sales Contacts

WASHINGTON, D.C. – With three of the planned nine cities under their belts, exhibitors in the Computer Caravan sponsored by *Computerworld* are getting used to the concept – and making sales.

"We got enough sales leads in the first show to pay for the whole trip," according to a Hewlett-Packard representative.

"In Boston we got five to 10 strong sales leads – sales we think we can close – and that more than pays for our costs of participating in the entire nine-city tour," he said.

"For a while we were worried that we might not be seeing enough people," another exhibitor said. "We were used to the Joints where you see 15,000 to 20,000 people in three days, but here we're only seeing 2,000 to 3,000."

'Solid Contacts'

"But we've found," he said, "that we are making good, solid contacts with the people we have seen here – and by the end of the tour we will have seen at least as many people as we do at the bigger shows."

Another exhibitor said the shows were cost effective for his firm. "At Lockheed Electronics," he said, "we figure it costs around $50 to $60 for a good sales contact – a probable sale.

"On that basis," he said, "we feel that we are seeing enough good contacts here to be under that cost. So economically it makes sense to be with the show. In fact, we may get a bigger booth if the show is run next year."

"The convenience of the shows is really great," another exhibitor said. "I haven't had to worry about setting up the booth or any of the headaches that usually plague an exhibitor at this type of thing. All I had to do was show up at opening time," said Peter Young of Interdata. "I think we will be very successful with the smaller Caravan approach as it moves around the country," he added.

The Caravan's concept of packaged booths – with all set up and dismantling handled by the show management – seems to be catching on with other exhibit managements.

The American Federation of Information Processing Societies (Afips), which sponsors the semiannual Joint Computer Conferences, last week began to publicize a packaged booth concept.

Sources close to the Joints said the service was always available to exhibitors, but admitted that the service had never been really publicized earlier.

Under the concept Afips will supply standard booths to exhibitors who don't want to spend on developing their own booths.

The Afips booths will come in three models and are priced from $440 to $690, which includes set-up and dismantling.

Bema Report

Export Policies Need DP Voice

WASHINGTON, D.C. – The U.S. computer industry is experiencing a "lack of dialogue with our own government on crucial issues" in the foreign trade area, according to the Business Equipment Manufacturers Association (Bema).

In a report on "Foreign Trade Issues Affecting the Data Processing Equipment Manufacturing Industry," the trade group said this lack of dialogue is causing "unrealistic limitations" imposed on foreign operations of U.S. firms.

'Severe Restrictions'

"Despite the fact that our industry is expanding its exports each year and has consistently produced a growing trade surplus, and despite the fact that vigorous foreign competition is increasing substantially," Bema said the U.S. Government has placed "severe restrictions" on exports to emerging and potentially profitable market areas.

Bema points out that during the period from 1963 to 1970 U.S. revenues from the exports of computer equipment increased from $180 million to over $1 billion.

The contribution of these exports to the U.S. balance of trade rose from around 3% to 37% during the same period, Bema noted, adding that the sales total of U.S. firms could more than double in the next five or six years, if supported by national policy.

At the same time, Bema said foreign trade was threatened by bills before Congress to limit the activities of multinational companies – a category that includes almost every computer manufacturer.

To combat the possible ill effects of such regulation, executives in the industry should take greater interest in politics and be willing to speak out on specific legislation that threatens the future of the industry, Bema said.

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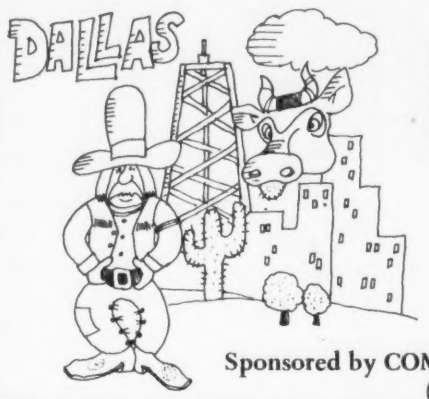

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'Minireader' Handles 300 Card/Min

WOODLAND HILLS, Calif. – The Data Products Model 8330 card reader, designed for use with minicomputers and remote batch terminals, can asynchronously read standard 80-col cards at over 300 card/min, according to the company.

The 8330 "minireader" is the lowest-cost model in Data Products' family of card readers and punches and is the first in the 8300 Series, according to Joseph Cornyn, vice-president of OEM marketing. Higher speed models, operating at 500-

New OEM Products

and 600 card/min using the 8330 controller interface, will be introduced this summer, Cornyn said.

The 8330 features solid-state, light-emitting diodes for data and timing sensing, and a card-selection mechanism for maximum pick reliability, according to the company.

All control electronics are mounted on a single, exchangeable printed circuit board. Other features include a universal interface for controller adaption, and the facility to load and unload cards during operation.

An option provides IBM-compatible mark-sense capability.

CA Has On-Line Test System

NEWPORT BEACH, Calif. – An integrated, computer-driven testing system that automatically performs on-line diagnostics for any kind of digital logic module has been introduced here by Computer Automation, Inc.

The Capable II tester system has a configuration incorporating proprietary software that enables production technicians to perform up to 100,000 functional pin test/sec, the company said.

Other New Products

Industrial Nucleonics Corp., Columbus, Ohio, has introduced an automation and data processing system for the paper industry – the Accuray 780. The system, priced in the $200,000 to $300,000 range, provides a combination of advanced controls for basis weight and moisture according to optimum economic criteria.

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Cycle times, idling periods and other machine operations are monitored automatically and presented in plain language by the Statalog event logger that scans each of 100 channels 1,000 time/sec. The Statalog, from Sturge Automation, Ltd., Birmingham, England, is intended for industrial control rooms and machine shops to record the use made of machinery and the level of efficiency.

– – –

Macrodata, Chatsworth, Calif., has announced the MD-100-E, a 5-MHz, LSI memory tester for use in incoming inspection applications. A complete turnkey test package consists of the MD-100-E, a personality card matching the memory under test to the system, and a "firmware" test program.

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A new bidirectional reel-to-reel drive cassette tape transport, the Model 260, from Computer Access Systems, Phoenix, has two moving parts which are two small DC motor-tachs. This design eliminates all capstans, belts, solenoids, pinch rollers and mechanical clutches resulting in gentle tape handling, high reliability and minimum maintenance, the company said.

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A programmable PCM bit synchronizer/signal conditioner with guaranteed bit error probability performance within .5 db of the theoretical curve, the Model D52071, has been announced by Elpac Data Systems, Irvine, Calif.

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MFE Corp., Wilmington, Mass., has announced the Model 2000 Graphic Input Translator, an accurate low-cost instrument designed to transform graphic information into analog voltages for subsequent analog or digital processing.

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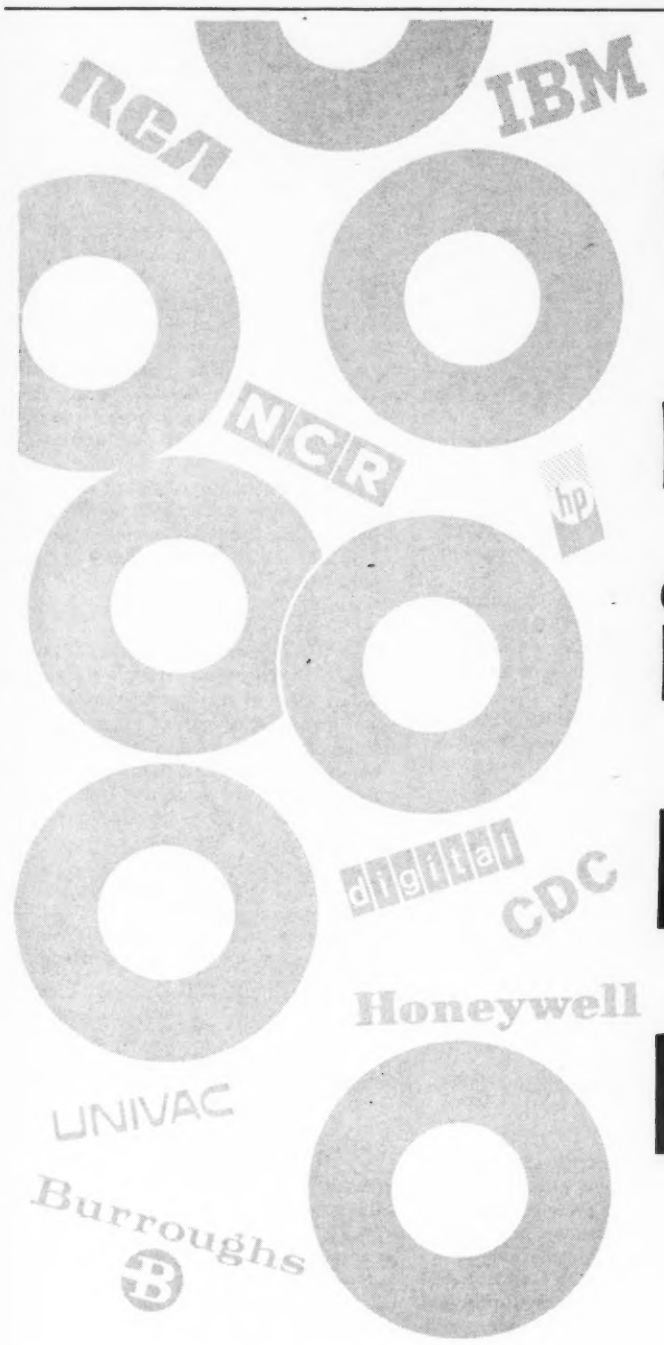
American Science and Engineering, Inc., Cambridge, Mass., is offering a nuclear pulse height analyzer interface to Data General's Nova computer line. It features up to 13 bits input from the analog/digital converter (ADC), latching of most significant bits under program control to direct base address, a hold buffer for immediate ADC dismissal, live and real time clocks, digital-to-analog converters for scope and plotter drives, and output signals for experiment control.

– – –

The Model 2020 mag tape cassette drive from Canberra Industries, Inc., Meriden, Conn., is available with hardware and software packages for the Digital Equipment Corp. PDP-8 and PDP-11 families and the Data General Nova family.

– – –

Versatec, Cupertino, Calif., has reduced prices up to 25% for 8-1/2- and 11-in. roll and fanfold paper for use with the firm's line of Matrix electrostatic printers, plotters and combination printer/plotter units.



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Cuts in Planned Government Budget Criticized by Australian DP Industry

Special to Computerworld

SYDNEY, Australia – The Australian computer industry has found much it dislikes about the expenditure plans of its largest customer, the Federal Government.

At the annual conference of the New South Wales branch of the Australian Computer Society, a planning executive from ICL Australia forecast that 1972 "will not be a buoyant year for Australian data processing."

Service industries, including the computer industry, would suffer from government cutbacks in capital outlays aimed to dampen demand, he said.

The immediate effect is loss of some $42 million of new equipment orders in the year ended September 1971. Forecasts had been made for new equipment orders to reach $97 million. They actually totaled $54.8 million.

Stronger criticism followed from IBM Australia, an even larger supplier to government than ICL. The company managing director, A.G. Moyes said that Federal Government DP cuts were "misguided" and that its planned level of computer buying for 1971-72 was a "disaster."

Information tabled in the auditor-general's report showed that planned spending on purchases of equipment by federal departments and authorities was $7.75 million or roughly a quarter of the previous year, equal to a 9.6% increase in total Australian Government EDP equipment investment after a 1969-70 increase of 37%.

The recent U.S. recession has affected the current Australian situation. Hit hard in their home markets, U.S. manufacturers are looking to their overseas operations to expand their market base.

Denied the opportunity of growth of its computer purchases, Australia is one of the most under-computerized industrial countries.

Figures from the planning department of one major marketer suggest Australian computer usage, expressed as the ratio of the value of equipment installed and on order to value of GNP less rural sector, is lower than that of West Germany, Japan, Sweden, UK and Canada.

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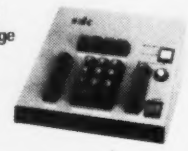

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Acquisitions

Extek Microsystems Inc., a microfilm duplicating equipment firm, has completed the acquisition of **Morgan Information Systems**. Morgan's principal product is a microfilm storage and retrieval system.

ISC/Pryor Computer has acquired **Pryor-Tim Inc.**, a Chicago-based remote computing company.

Pertec Corp. has agreed in principle to acquire **Eikon Data Systems** for cash and stock. Eikon designs impact line printers.

Applied Data Research has agreed in principle to acquire **Comserv**, a time-sharing firm, for an exchange of stock. The merger is subject to approval by shareholders of both companies.

Dier Computer Corp. Ltd., an Australian leasing company, has acquired an 80% interest in **Data Processing Customer Engineering Pty, Ltd.**, a Sydney-based maintenance firm.

Clasco Inc. has sold its **Systems Division** to **Clasco Systems Inc.** (CSI) for an exchange of stock and cash.

Computer Sciences Corp. has agreed in principle to merge the operations and resources of its South African Affiliate, **Computer Sciences S.A. Ltd.**, with two South African service companies. The new company will be called Computer Sciences Sigma Ltd.

New Registrations

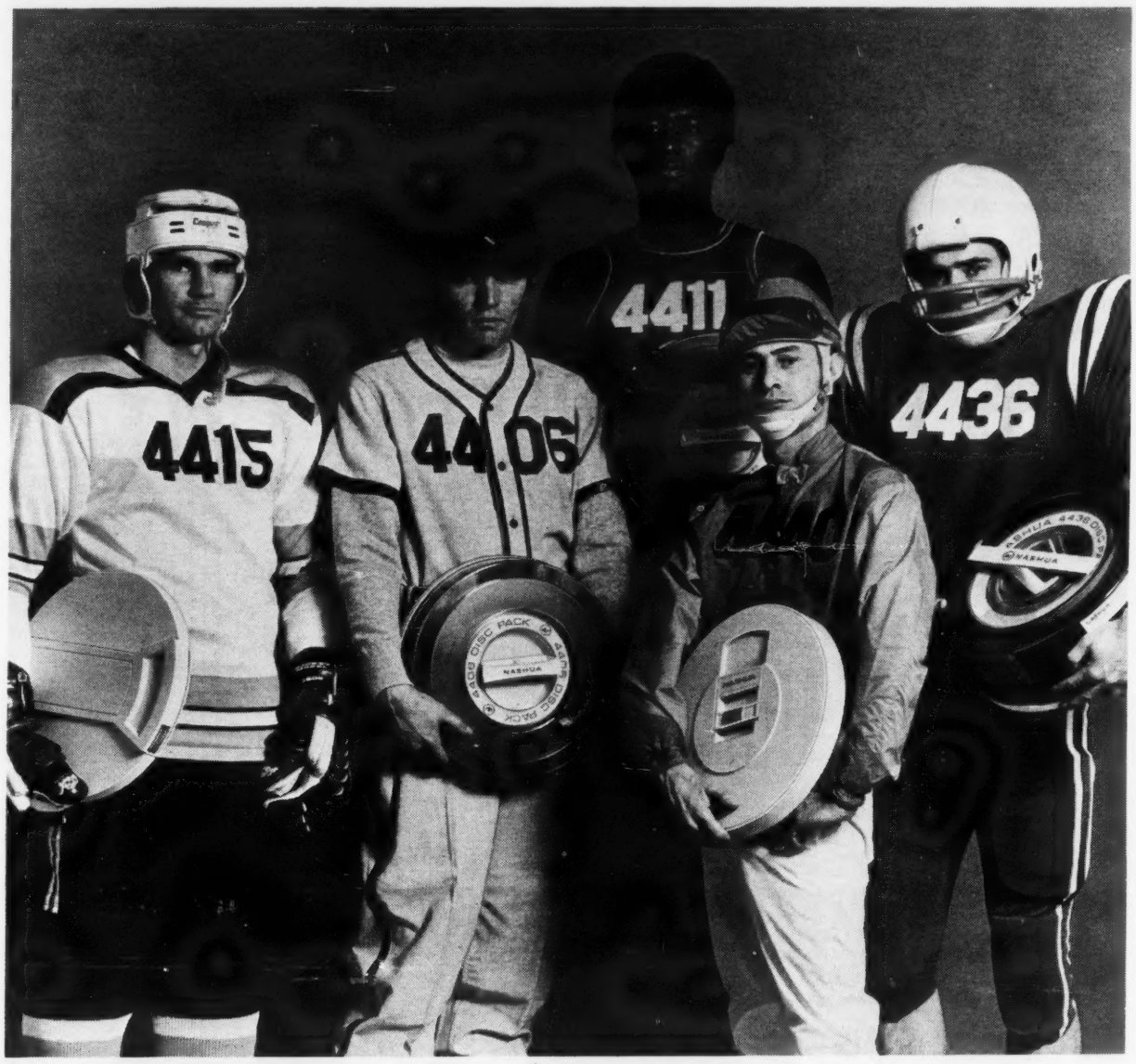
COMPUTER CONSULTANTS INC., 1613 University Blvd., N.E., Albuquerque, N.M., a proprietary software company, filed to register one million shares of common. Proceeds, at $4 per share, to be used to complete an office building complex and for working capital. No underwriter is involved.

LEASCO CORP., 280 Park Ave., New York, N.Y., a leasing and software firm, filed to register 225,089 shares of common at $19-7/8 per share maximum.

MCDONALD MICRADATA SERVICES, INC., 259 Broadway, New York, N.Y., a microfilm and DP service company, filed to register 130,000 shares of common. Proceeds, at $1.50 per share, intended for working capital. The underwriter is T.H. Lehman & Co., Inc., 120 Wall St., New York, N.Y. 10005.

CAR/PUTER INTERNATIONAL CORP., 1603 Bushwick Ave., Brooklyn, N.Y., a computerized consumer information service company, filed to register 100,000 shares of common. Proceeds, at $5.50 per share, intended for advertising and promotion. The underwriter is A.J. Carno Co., Inc., 42 Broadway, New York, N.Y. 10004

INDECON, INC., 300 S. Wacker Drive, Chicago, Ill., software developer, filed to register 100,000 shares of common. Proceeds, at $5 per share, intended for market expansion of present products and development of additional programs. The underwriter is P & H Associates, 5 Hanover Sq., New York, N.Y. 10004.



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Minneapolis, Minnesota, (612) 888-2211
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New York, New York, (212) 532-6500
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UCC Pegs 1971 Earnings at $2.6 Million

DALLAS – Aided by "marked improvement" in its computer utility services sector and contributions from its Computer Technology and insurance subsidiaries, University Computing Corp. registered earnings of $2.6 million, a turnaround from last year's restated $16.8 million loss.

Results for the fourth quarter ended Dec. 31, although a loss, were also improved. The loss was cut to $2.5 million, or 33 cents a share, from $12.3 million in the 1970 period.

Consolidated revenue from Computer Technology Inc. was $33.9 million for the year and $8.1 million for the fourth quarter. Computer Technology, a consolidated subsidiary since the fourth quarter of 1970, was merged into UCC as of Dec. 31, 1971.

The gross margin of computer utility services before allocation of interest and selling and administrative costs increased by about $7 million, or 70%, over 1970, according to Charles J. Wyly Jr., UCC president and chief executive.

UCC's insurance subsidiaries, the Gulf Group, which scored its first underwriting profit in five years, accounted for $13.4 million before taxes and other expenses, he said. Included in insurance income was $8.5 million of realized capital gains.

UCC's consolidated revenue, which does not include insurance, was $128 million in 1971 and $27.9 million for the fourth quarter, compared with 1970's $114.9 million and $33.2 million, respectively.

The proprietary computer communications product business underwent major changes during the year, switching from sales to rental business, he noted. Products shipped as rentals increased to more than 80% from 30% in 1970. This unfavorably impacted UCC consolidated revenue and earnings in 1971, but should improve future results, he said.

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Nickels & Dimes

Atlantic Technology has enlisted F.S. Smithers & Co., Inc. to raise $1.5 million in equity financing for expanded production of the firm's ATC 2000 CRT unit. The move is in conjunction with a letter of intent from Randolph Computer Corp. to provide lease financing.

$$$

Storage Technology's plan of accounting for sales of equipment to Decimus Corp. on an "actual sales" basis has been approved by the firm's auditors and the SEC and the agreement between the two firms is effective. Under the agreement, STC may sell to Decimus over the next three years $21 million in peripherals leased to end users.

$$$

Missing from the mail: quarterly dividend on **Electronic Memories & Magnetics** preferred stock. The board of directors decided not to pay the dividend because of the "company's requirement for significant amounts of funds during the early part of 1972 for the manufacture and lease of core memories" and expanded marketing.

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TRADE*QUOTES

Computerworld Stock Trading Summary

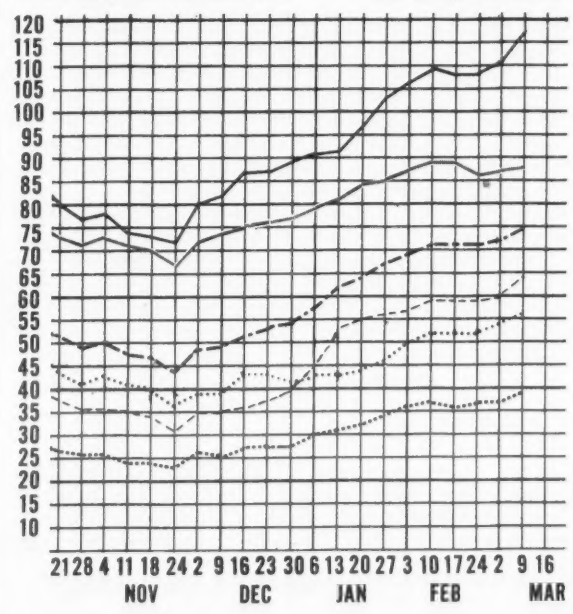
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, MARCH 9, 1972

EXCH		71-72 RANGE (1)	CLOSE MAR 9 1972	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 4	1 3/4	- 1/8	-6.6
A	APPLIED DATA RES.	5- 13	6	- 1/4	-4.0
O	APPLIED LOGIC	1- 3	2 1/4	0	0.0
N	AUTOMATIC DATA PROC	44- 91	90 7/8	+4 5/8	+5.3
O	AUTO SCIENCES	1- 8	5/8	0	0.0
O	COMPUTER DIMENSIONS	9- 17	12	- 3/4	-5.8
O	COMPUTER NETWORK	2- 11	4 3/4	- 1/4	-5.0
N	COMPUTER SCIENCES	6- 17	8 5/8	+ 1/8	+1.4
O	COMPUTER TECHNOLOGY	4- 11	6 3/4	+ 7/8	+14.8
O	COMPUTER USAGE	5- 16	11 3/8	+ 5/8	+5.8
O	COMP AUTOMOT REPORTS	6- 13	7 1/4	+ 1/4	+3.5
N	COMPUTING & SOFTWARE	17- 45	26 3/4	+3 1/4	+13.8
O	COMRESS	1- 4	2 1/4	+ 1/8	+5.8
O	COMSHARE	4- 9	8	+ 1/2	+6.6
O	DATA AUTOMATION	1- 4	1/4	+ 1/8	+100.0
O	DATA PACKAGING	6- 10	10	+1	+11.1
O	DATAMATION SERVICE	1- 3	7/8	- 1/8	-12.5
L	DATATAB	3- 8	8 1/4	+1	+13.7
O	EDP RESOURCES	5- 16	6 7/8	+1 3/8	+25.0
A	ELECT COMP PROG	2- 7	4 1/2	+ 1/4	+5.8
N	ELECTRONIC DATA SYS.	34- 85	62 1/8	+9 1/8	+17.2
O	INFORMATICS	6- 15	9 1/4	- 3/8	-3.8
O	I.O.A. DATA CORP	1- 3	1 3/4	+ 1/4	+16.6
A	ITEL	7- 23	11 1/2	- 1/4	-2.1
O	KEANE ASSOCIATES	4- 14	4 1/2	0	0.0
O	KEYDATA CORP	5- 14	10 1/4	0	0.0
O	LOGICON	5- 8	8 1/8	+ 3/8	+4.8
A	MANAGEMENT DATA	5- 11	7 7/8	- 1/2	-5.9
O	NATIONAL CSS INC	7- 14	12	+ 1/4	+2.1
O	NAT COMP ANALYSTS	1- 4	3/4	0	0.0
P	ON LINE SYSTEMS INC	7- 18	12 1/4	+ 1/4	+2.0
N	PLANNING RESEARCH	10- 26	17 1/8	+2 1/8	+14.1
O	PROGRAMMING METHODS	16- 29	23 1/2	0	0.0
O	PROGRAMMING & SYS	1- 4	1 3/4	0	0.0
O	SCIENTIFIC COMPUTERS	2- 4	3 1/8	- 1/8	-3.8
O	SIMPLICITY COMPUTER	1- 4	4 5/8	+1 1/2	+48.0
O	SOFTWARE SYSTEMS	1- 3	1 3/8	0	0.0
O	TBS COMPUTER CENTERS	4- 9	4 7/8	0	0.0
O	TOLLEY INTL CORP	3- 8	12	+ 7/8	+7.8
O	TRACOR COMPUTING	2- 5	1 7/8	0	0.0
O	TYMSHARE INC	4- 15	8 1/4	+ 1/2	+6.4
O	UNITED DATA CENTER	2- 8	6 1/2	- 1/4	-3.7
N	UNIVERSITY COMPUTING	14- 38	21 3/4	+2 1/4	+11.5
A	URS SYSTEMS	5- 11	8 3/4	+ 1/2	+6.0
O	VORTEX CORP	2- 6	5 1/4	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	24- 48	41 1/2	- 1/2	-1.1
O	ALPHANUMERIC	1- 6	1 1/4	0	0.0
N	AMPEX CORP	8- 25	8 5/8	- 3/8	-4.1
O	ANDERSON JACOBSON	5- 10	6 5/8	- 3/8	-5.3
O	ATLANTIC TECHNOLOGY	3- 9	8 3/4	+ 1/4	+2.9
A	BOLT,BERANEK & NEW	4- 11	11	+3	+37.5
N	BUNKER-RAMO	6- 17	11 1/2	+ 7/8	+8.2
A	CALCOMP	14- 33	24 3/8	+ 3/4	+3.1
O	COGNITRONICS	2- 9	3 1/2	- 1/8	-3.4
O	COMPUTER COMMUN.	5- 19	5 3/4	- 3/8	-6.1
A	COMPUTER EQUIPMENT	3- 7	4	+ 1/8	+3.2
A	COMPUTEST	4- 20	7 5/8	- 1/8	-1.6
O	CONSOL COMPUTER LTD.	1- 12	1/2	0	0.0
A	DATA PRODUCTS CORP	3- 10	5 3/4	+ 1/8	+2.2
O	DATA RECOGNITION	3- 8	4 1/4	- 1/4	-5.5
O	DATA TECHNOLOGY	3- 9	4	+ 1/4	+6.6
O	DI/AN CONTROLS	3- 7	5	+ 1/4	+5.2
O	DIGITRONICS	2- 8	3 3/4	+ 7/8	+30.4
N	ELECTRONIC M & M	5- 16	7 1/4	+ 3/8	+5.4
O	FABRI-TEK	2- 5	4 1/2	+ 7/8	+24.1
O	GENERAL COMPUTER SYS	6- 16	13 1/2	-1	-6.8
N	GENERAL ELECTRIC	53-124	64	+2 3/8	+3.8
N	HAZELTINE CORP	6- 13	11 1/2	- 1/2	-4.1
O	INFOREX INC	17- 49	37	-1	-2.6
O	INFORMATION DISPLAYS	3- 8	3 1/4	- 1/4	-7.1
O	MANAGEMENT ASSIST	1- 2	1 3/8	+ 3/8	+37.5
A	MARSHALL INDUSTRIES	7- 27	13 5/8	+2 5/8	+23.8
N	MEMOREX	20- 78	29 1/2	+1 1/2	+5.3
A	MILGO ELECTRONICS	12- 34	33 1/2	+3	+9.8
N	MOHAWK DATA SCI	15- 47	24 3/8	+3	+14.0
O	OPTICAL SCANNING	6- 18	12 3/4	+ 3/4	+6.2
O	PERTEC CORP	9- 18	14 3/4	- 1/2	-3.2
O	PHOTON	6- 15	13 3/4	- 1/4	-1.7
A	POTTER INSTRUMENT	11- 25	18 3/4	+ 1/4	+1.3
O	PRECISION INST.	7- 16	8 3/4	- 3/4	-7.8
O	RECOGNITION EQUIP	9- 26	12 1/2	- 1/4	-1.9
O	REDCOR CORP.	1- 9	1/4	- 1/8	-33.3
N	SANDERS ASSOCIATES	9- 22	20 5/8	+2 1/8	+11.4
O	SCAN DATA	6- 15	12 5/8	- 5/8	-4.7
O	SYCOR INC	3- 11	8 3/4	+ 1/4	+2.9
O	TALLY CORP.	6- 16	10 1/4	+ 5/8	+6.4
N	TEKTRONIX INC	28- 44	44	+2 1/4	+5.3
N	TELEX	8- 22	12 7/8	+ 1/2	+4.0
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	9- 19	11 5/8	-1 1/8	-8.8
O	BALTIMORE BUS FORMS	6- 10	7	- 3/4	-9.6
A	BARRY WRIGHT	7- 13	12 1/4	+ 1/8	+1.0
A	DATA DOCUMENTS	14- 29	21 3/4	- 1/2	-2.2
O	DUPLEX PRODUCTS INC	8- 14	13 1/4	+ 1/4	+1.9
N	ENNIS BUS. FORMS	5- 13	8 1/4	0	0.0
O	GRAHAM MAGNETICS	9- 35	24 5/8	- 1/4	-1.0
O	GRAPHIC CONTROLS	6- 15	14	+2 1/8	+17.8
N	3M COMPANY	96-144	143 1/2	+3 1/2	+2.5
O	MOORE BUS. FORMS	36- 48	46 7/8	- 7/8	-1.8
N	NASHUA CORP	29- 56	56 1/8	+1 1/8	+2.0
O	REYNOLDS & REYNOLD	37- 77	45	+7 3/4	+20.8
O	STANDARD REGISTER	14- 23	19	- 1/4	-1.2
O	TAB PRODUCTS CO	8- 17	14 3/4	+ 1/4	+1.7
N	UARCO	23- 34	26 1/4	- 1/2	-1.8
A	WABASH MAGNETICS	5- 10	9 7/8	+ 3/8	+3.9
N	WALLACE BUS FORMS	18- 26	24 7/8	+ 1/2	+2.0
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	105-171	170 7/8	+1 7/8	+1.1
N	COLLINS RADIO	10- 20	17 7/8	+2 1/2	+16.2
N	CONTROL DATA CORP	34- 83	66 3/8	+7 1/8	+12.0
O	DATA GENERAL CORP	19- 80	74	-2 3/4	-3.5
O	DIGITAL COMP CONTROL	4- 24	19 1/4	+ 1/2	+2.6
N	DIGITAL EQUIPMENT	53- 97	93	-1 7/8	-1.9
N	ELECTRONIC ASSOC.	5- 9	8 3/4	+ 1/4	+2.9
A	ELECTRONIC ENGINEER.	5- 14	12 1/4	+ 1/2	+4.2
N	FOXBORO	25- 46	36 3/4	0	0.0
O	GENERAL AUTOMATION	9- 26	24 1/4	-1 1/4	-4.9
N	HEWLETT-PACKARD CO	30- 56	55 3/8	-1	-1.7
N	HONEYWELL INC	83-158	156 3/4	+3 1/4	+2.1
N	IBM	284-384	383	+6 3/4	+1.7
O	INTERDATA INC	6- 15	14 1/2	+4 1/2	+45.0
N	NCR	25- 49	34 1/8	+ 7/8	+2.6
N	RAYTHEON CO	27- 46	43	- 1/2	-1.1
N	SPERRY RAND	23- 39	38 1/2	+ 7/8	+2.3
A	SYSTEMS ENG. LABS	7- 18	16	+ 1/2	+3.2
N	VARIAN ASSOCIATES	11- 18	17 7/8	+1 7/8	+11.7
N	VICTOR COMPTOMETER	12- 27	21 3/8	+3 3/4	+21.2
N	WANG LABS.	29- 50	38 1/2	+2	+5.4
N	XEROX CORP	85-143	142 1/2	+3 5/8	+2.6
	LEASING COMPANIES				
A	BOOTHE COMPUTER	11- 27	12 1/4	- 5/8	-4.8
O	BRESNAHAN COMP.	2- 4	2 7/8	- 1/8	-4.1
O	COMPUTER EXCHANGE	1- 9	2 1/8	0	0.0
A	COMPUTER INVSTRS GRP	7- 14	13 5/8	+1 1/8	+9.0
N	DPF INC	8- 19	11 5/8	+ 1/2	+4.4
O	DATRONIC RENTAL	2- 4	3 1/2	+ 1/8	+3.7
A	DCL INC	5- 13	9 3/8	+ 5/8	+7.1
A	DEARBORN-STORM	12- 25	23 7/8	+2 1/8	+9.7
A	DPA, INC.	4- 9	6 5/8	+ 3/8	+6.0
A	GRANITE MGT	7- 13	11	+2 1/8	+23.9
A	GREYHOUND COMPUTER	7- 11	10	+ 1/8	+1.2
N	LEASCO CORP	16- 26	24	+1 1/4	+5.4
O	LECTRO MGT INC	2- 5	2 1/2	0	0.0
O	NCC INDUSTRIES	3- 11	10 3/8	- 1/8	-1.1
A	ROCKWOOD COMPUTER	3- 9	6 1/4	- 1/4	-3.8
O	SYSTEMS CAPITAL	3- 7	6 1/2	- 7/8	-11.8
N	U.S. LEASING	16- 48	46 5/8	+2 7/8	+6.5

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

ROCKWOOD COMPUTER
Nine Months Ended Dec. 31

	1971	a1970
bShr Ernd	$.42	$.42
Revenue	39,804,956	33,824,841
Spec Item	c395,295	d5,858,470
Earnings (Loss)	e1,861,352	(4,442,731)

a-Restated. b-Based on income before special items. c-Credit; consists of $360,044 gain on repurchase of company's publicly held debentures and $35,251 capital loss carryforward. d-Debit; consists of $6,489,289 loss from discontinued operations and sales of subsidiaries and other assets, less gain on repurchase of company's publicly held debentures. e-Equal to 54 cents a share.

SANDERS ASSOCIATES
Three Months Ended Jan. 28

	1972	1971
Shr Ernd	a$.07	$.04
Revenue	36,601,000	40,475,000
Spec Cred	b269,000	.....
Earnings	c559,000	182,000
6 Mo Shr	a.12	.08
Revenue	66,157,000	78,184,000
Spec Cred	b483,000	.....
Earnings	c1,019,000	375,000

a-Based on income before special credit. b-From tax loss carryforward. c-Equal to 12 cents a share in the quarter and 22 cents a share in the six months.

HONEYWELL
Year Ended Dec. 31

	a1971 (000)	b1970 (000)
cShr Ernd	$3.70	$3.34
Revenue	1,946,127	1,921,194
Spec Cred	e3,542	f4,187
gEarnings	69,262	61,650
c3 Mo Shr	1.96	1.20
Revenue	578,811	511,141
Spec Cred	e1,289	f3,639
gEarnings	36,595	24,336

a-Preliminary. b-Restated to reflect merger of General Electric Co. computer business into Honeywell on Oct. 1, 1970. c-Based on income before special credit. e-Tax benefits from foreign operating loss carryforwards, less writeoffs in conjunction with plant closings and discontinuance of product lines. f-Tax benefits from foreign operating loss carryforwards. g-Equal to $3.90 a share for the year and $2.03 a share for the quarter of 1971 compared with $3.58 and $1.41 in 1970.

METRIDATA COMPUTING
Year Ended Dec. 31

	1971	1970
aShr Ernd	$.33	$.04
Revenue	2,694,576	1,526,455
Tax Cred	104,000	4,000
bEarnings	224,660	18,065
a3 Mo Shr	.11	.08
Revenue	733,837	517,689
Tax Cred	33,964	25,176
bEarnings	73,369	54,386

a-Based on income before tax credit. b-Equal to 62 cents a share in the year and 20 cents a share in the quarter of 1971 compared with 5 cents and 15 cents respectively in 1970.

DATA PACKAGING
Year Ended Nov. 27

	1971	1970
aShr Ernd	$.04	$.22
Revenue	10,917,778	13,178,344
Spec Chg	b82,000	e360,030
Earnings (Loss)	(20,533)	3,808
3 Mo Shr	a.11	.....
Revenue	2,923,364	2,489,632
Spec Chg	b82,000	e360,030
Earnings (Loss)	f98,422	(475,562)

a-Based on income before special charge. b-From writedown of value in an investment. e-From a writeoff of an investment. f-Equal to 6 cents a share.

SCIENTIFIC COMPUTERS
Six Months Ended Dec. 31

	1971	1970
Shr Ernd	$.11	$.04
Revenue	1,683,419	1,588,806
Earnings	85,645	29,747

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